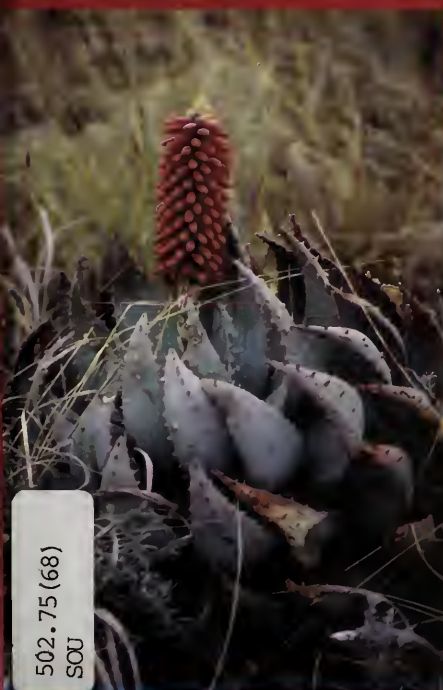




# Southern African Plant Red Data Lists

Edited by Janice Golding



# Quick Reference Guide

## Summary of IUCN 1994 Red Data List Categories Used in this Book

<b>EX</b>	Extinct	A taxon is Extinct when there is no reasonable doubt that the last individual has died.
<b>EXW</b>	Extinct in the Wild	A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.
<b>CR</b>	Critically Endangered	A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
<b>EN</b>	Endangered	A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
<b>VU</b>	Vulnerable	A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.
<b>LR</b>	Lower Risk	A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category are separated into two subcategories:
<b>LR-nt</b>	Lower Risk–Near Threatened	Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
<b>LR-lc</b>	Lower Risk–Least Concern	Taxa which do not qualify for Conservation Dependent or Near Threatened.
<b>DD</b>	Data Deficient	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

### Criteria for the *Critically Endangered*, *Endangered* and *Vulnerable* Categories

	Critically Endangered	Endangered	Vulnerable
<b>A Declining Population</b> Population decline rate at least	80% in 10 years or 3 generations using either or based on a direct observation b an index of abundance appropriate for the taxon c a decline in area of occupancy, extent of occurrence and/or quality of habitat d actual or potential levels of exploitation e the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites	50% in 10 years or 3 generations 1 population reduction observed, estimated, inferred, or suspected in the past 2 population decline projected or suspected in the future	20% in 10 years or 3 generations
<b>B Small Distribution and Decline or Fluctuation</b> Either Extent of Occurrence or Area of Occupancy and two of the following three: 1 either severely fragmented or known to exist at x locations 2 continuing decline at in any of the following:	< 100 km <sup>2</sup> < 10 km <sup>2</sup> x ≤ 1 any rate a extent of occurrence b area of occupancy c area, extent and/or quality of habitat d number of locations or subpopulations e number of mature individuals	< 5,000 km <sup>2</sup> < 500 km <sup>2</sup> x ≤ 5 any rate	< 20,000 km <sup>2</sup> < 2,000 km <sup>2</sup> x ≤ 10 any rate
<b>3 fluctuating</b> in any of the following:	> 1 order of magnitude a extent of occurrence b area of occupancy c number of locations or subpopulations d number of mature individuals	> 1 order of magnitude	> 1 order of magnitude
<b>C Small Population Size and Decline</b> Number of mature individuals and one of the following two: 1 rapid decline rate of at least 2 continuing decline and either a fragmented or b all individuals in a single sub-population	< 250 25% in 3 years or 1 generation any rate all sub-pops < 50	< 2,500 20% in 5 years or 2 generations any rate all sub-pops < 250	< 10,000 10% in 10 years or 3 generations any rate all sub-pops < 1,000
<b>D Very Small or Restricted</b> Either 1 number of mature individuals or 2 population is susceptible	< 50 (not applicable)	< 250 (not applicable)	< 1,000 area of occupancy < 100 km <sup>2</sup> or number of locations < 5
<b>E Quantitative analysis</b> Indicating the probability of extinction in the wild to be at least	50% in 10 years or 3 generations	20% in 20 years or 5 generations	10% in 100 years

### For more detailed information on the IUCN categories, see the Appendices:

- For detailed information on the IUCN 1994 categories, see Appendix 1.
- For detailed information on the IUCN 1994 categories in Portuguese, see Appendix 2.
- For detailed information on the IUCN 2001 categories, see Appendix 3.
- For guidelines on applying the 1994 categories, see Appendix 4.
- For guidelines on applying the 2001 categories at a national level, see Appendix 5.

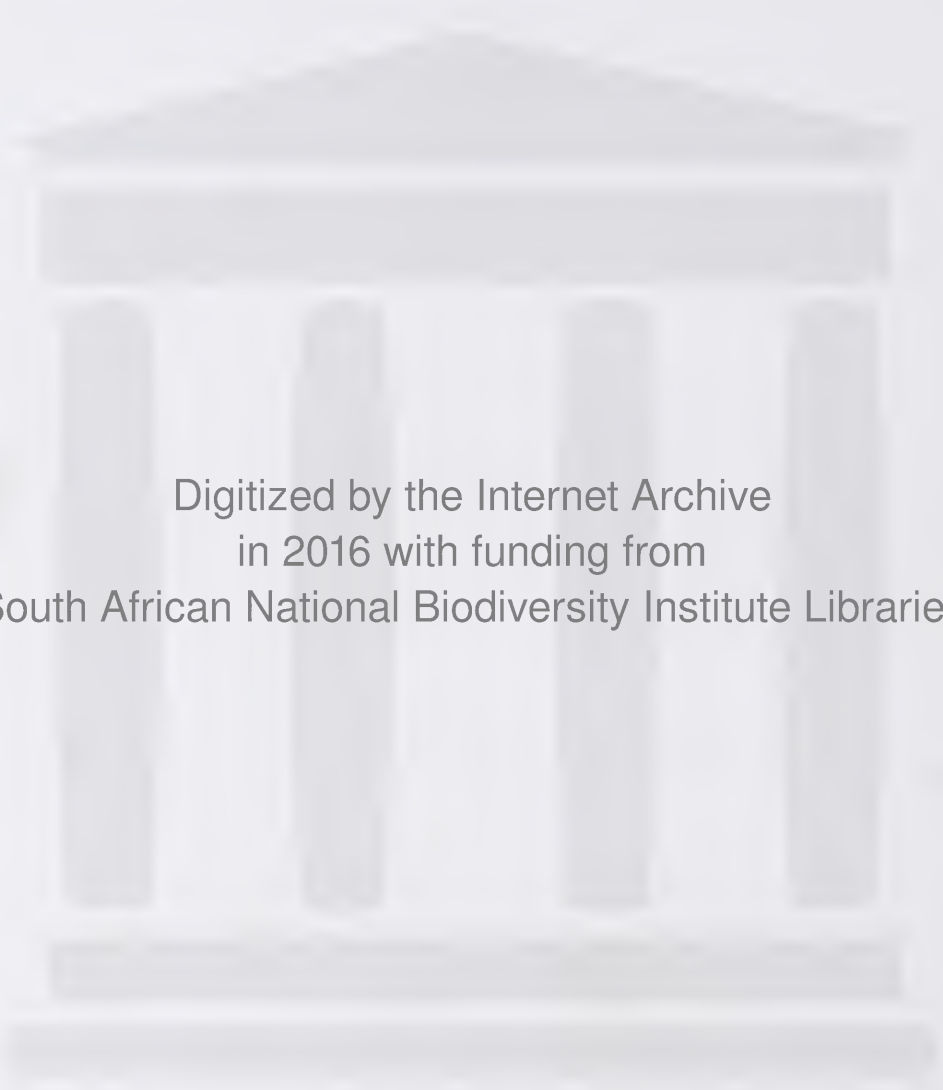


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*Southern African  
Plant Red Data Lists*









# *Southern African Plant Red Data Lists*

*Edited by  
Janice S. Golding*

*with contributions by  
Salomão O. Bandeira  
Mike G. Bingham  
Patricia Craven  
Esperança da Costa  
Gideon M. Dlamini  
Titus S. Dlamini  
André Dombo  
Bruce Hargreaves  
Samira Izidine  
Sonja Loots  
Anthony Mapaura  
Enoch Mlangeni  
Gladys Msekandiana  
Georgina Neto  
Moffat P. Setshogo  
Paul P. Smith  
Sumitra Talukdar  
Jonathan R. Timberlake  
Janine E. Victor*

*Technical Editor  
Marthina Mössmer*





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Tel. (27) 12 804 3200

Fax: (27) 12 804 5979

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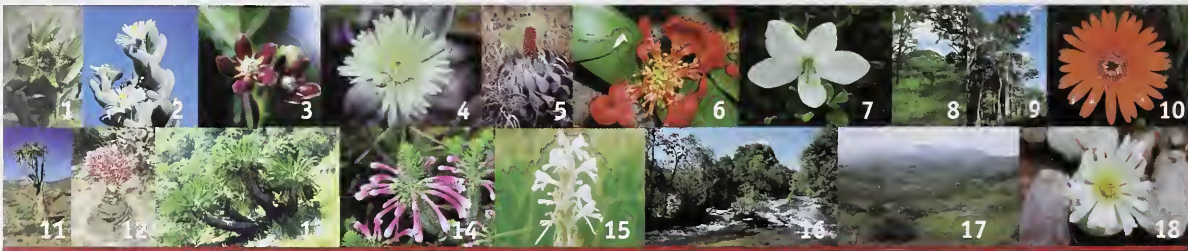
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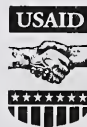
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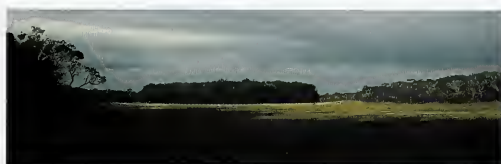
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Janice Golding  
Pretoria  
December 2001



# Foreword

Biodiversity loss is one of the world's most pressing crises. Species are declining to critical populations, important habitats are being destroyed, and ecosystems are being destabilised through climate change, pollution, alien invasive species, and direct human impacts. Yet there is also growing awareness of how biodiversity supports livelihoods, allows sustainable development, and fosters co-operation between nations. This awareness is promoted globally through products like the *IUCN Red List of Threatened Species*. Awareness is also generated at local levels through the production of regional and national Red Lists. The *Southern African Plant Red Data Lists* publication is an excellent example of such a contribution.

Red Data Lists are intended to be comprehensive and authoritative accounts of the global, regional or national conservation status of plants and animals. These publications help to convey the urgency and scale of conservation problems to the public and policy-makers, and are used to motivate the global community to take appropriate actions to reduce the loss of species. The Red Data Lists also help to establish conservation priorities at the local level and guide conservation actions.

The *IUCN Red List of Threatened Species* is compiled mainly through contributions from IUCN's 7,000 member Species Survival Commission (SSC) and partner organizations. However, regional and national Red List initiatives are making an increasingly important contribution to the IUCN Red List. Contributions from botanists on the state of Africa's plants have historically been very poor because of the lack of knowledge and lack of local capacity to collect such information. The IUCN's prototype Red Data Book *Animals and Plants Threatened with Extinction* produced in 1962, included a report on 'plants in danger' compiled by Noel Simon and Ronald Melville. African plants did not feature highly in this report, although *Encephalartos* and *Welwitschia* were mentioned. Similarly, Nigel Hepper's contribution, on the 'conservation of rare and vanishing plant species' in *The Red Book: Wildlife in Danger* produced by IUCN in 1969 does not mention any African plant species. A turning point came a year later, when data began to be more readily forthcoming. Ronald Melville included ten African plants in the *Red Data Book: Angiospermae* published by IUCN in 1970, nine of these plants were from South Africa. The trend continued with *The IUCN Plant Red Data Book* published in 1978, when Gren Lucas and Hugh Synge included accounts on 27 Sub-Saharan African plant species among the 250 accounts in the book. Fifteen of these species were from southern Africa. The southern African accounts were based on information provided by Anthony Hall and his co-

workers as a result of their pioneering efforts to compile the first list of *Threatened Plants of Southern Africa* in 1980.

Since the late 1970s, southern African botanists have made increasingly important contributions to the global IUCN Red Lists (1997–2000) through the ongoing compilation and publication of local, national, and regional Red Lists. Unfortunately, contributions from botanists to the north of the Limpopo River have been sadly lacking. This lack of input was certainly not because there were no conservation problems or that there was no awareness of the threats to species. In 1966, a symposium was held at the 6<sup>th</sup> meeting of the Association for the Taxonomic Study of the Flora of Tropical Africa (AETFAT) in Uppsala, Sweden, which looked at the *Conservation of Vegetation in Africa South of the Sahara*. Although the symposium primarily focussed on the conservation of habitats and ecosystems, threats to species were mentioned in the proceedings, which were published in 1968. For example, the late Hiram Wild (1968 pp. 54) in discussing the status of conservation in what is now Zimbabwe said the following:

There has been some concern expressed in recent years by the hawking, mainly in towns, of indigenous plants dug up from the wild. These include *Gloriosa superba*, *Eulophia petersii*, *Ansellia nilotica*, *Phoenix reclinata*, *Hyphaene ventricosa*, *Adiantum capillus-veneris*, *Aloes* spp., and *Monadenium obesum* var. *multiflorum*. None of these plants is rare but continued depredations could be harmful even to large populations.

Almost 35 years later, the *Adenium* and 14 *Aloe* taxa are listed as threatened in the account for Zimbabwe in this new southern African Red Data List.

Following the conservation symposium in 1966, Inga Hedberg, a renowned Swedish botanist who has done much to promote taxonomy and plant conservation in Africa, made a concerted effort to gather information on threatened plant species in Africa. This was compiled as a set of preliminary lists of rare and threatened species for various African countries and published in the symposium proceedings *Systematic Botany, Plant Utilization and Biosphere Conservation* in 1979 (pp. 82–104). This publication included lists for Angola (albeit very limited), Lesotho, South Africa, Swaziland, and Zimbabwe. Botswana at that stage was thought not to have any threatened species (thirteen are now listed in the *Southern African Plant Red Data Lists*) and Mozambique was not even mentioned. The lists were given to the then IUCN Threatened Plants Committee and the informa-

tion was incorporated into the threatened plants database. These preliminary lists formed in part the basis for the first attempted complete listing of threatened plants in the 1997 *IUCN Red List of Threatened Plants*.

In the introduction to the preliminary lists, Inga Hedberg pointed out that two important prerequisites for plant conservation were sadly lacking in Africa. These prerequisites are a comparatively detailed knowledge of the flora and organizations to take care of this knowledge and act upon it. Although the exploration of the African flora continues, our knowledge today is still incomplete. Even areas that have been relatively well explored are still floristically poorly known. Similarly, although many countries now have organizations to take conservation action, this is still lacking in key areas or is non-functional. Even in cases where such organizations do exist and are active, very few are concerned with the conservation of vegetation let alone individual plant species. Steps to reverse this situation are being taken and the Southern African Botanical Diversity Network (SABONET) is leading the way. SABONET is developing a strong core of professional botanists, taxonomists, horticulturists and plant diversity specialists across all ten southern African countries. These people have been trained to compile inventories, to evaluate the conservation status of plant species, to monitor these species, and to help conserve the botanical diversity of the region.

The capacity and competence that have been established through the SABONET project are clearly evident in the high quality content of the *Southern African Plant Red Data Lists*. Although we still have a long way to go in countries like Angola and Mozambique, a solid foundation for the future work has been laid. The co-ordinator, Janice Golding, and her team of national co-ordinators are to be congratulated on their perseverance to ensure participation and input from the region's botanists. In addition to producing the first-ever comprehensive and documented plant Red Data List for the whole region, a network of southern African threatened plant professionals has been established. This can only bode well for the future of plant conservation in southern Africa. Through projects like the SABONET Red Data List, southern Africa is taking its rightful place as a leader on the world-stage of plant conservation. The *Southern African Plant Red Data Lists* should be used as a model for what can be achieved elsewhere in Africa and even other parts of the world.

Craig Hilton-Taylor  
IUCN Red List Programme Officer, Cambridge,  
United Kingdom  
October 2001



## Abbreviations & Acronyms

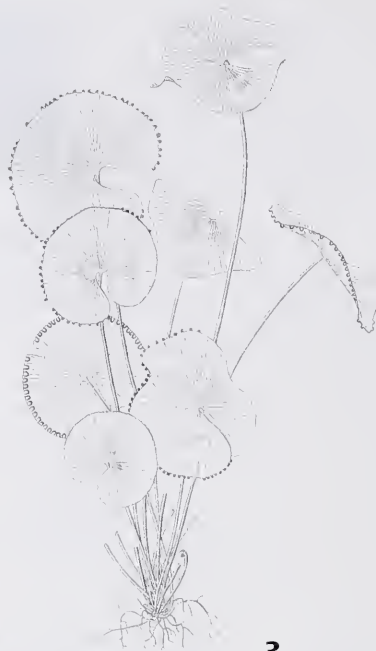
AETFAT	Association for the Taxonomic Study of the Flora of Tropical Africa
a.s.l.	above sea level
CSIR	Council for Scientific and Industrial Research
DRC	Democratic Republic of Congo
EIA	Environmental Impact Assessment
FSA	<i>Flora of southern Africa</i>
FZ	<i>Flora Zambesiaca</i>
GEF	Global Environment Facility
ha	hectare
IUCN	World Conservation Union
IUCN/SSC	World Conservation Union/Species Survival Commission
IUCN-ROSA	World Conservation Union (Regional Office for Southern Africa)
IUCN TPC	World Conservation Union Threatened Plants Committee
K	Royal Botanic Gardens Kew, United Kingdom
km	kilometre
KZN	KwaZulu-Natal
LHWP	Lesotho Highlands Water Project
LMA	INIA Herbarium, Maputo, Mozambique
LMU	Eduardo Mondlane University Herbarium, Maputo, Mozambique
LUAI	Luanda Herbarium, Agostinho Neto University, Luanda Angola
m	metre
MAL	National Herbarium, Zomba, Malawi
mm	millimetre
NBRI	National Botanical Research Institute
NBI	National Botanical Institute, South Africa
NDO	Kitwe Herbarium, Division of Forestry Research, Zambia
NPGRC	National Plant Genetic Resources Centre (Namibia)
p.a.	per annum
PRE	National Herbarium, Pretoria, South Africa
PRECIS	National Herbarium (PRE) Computerised Information System
PSUB	Maun Herbarium, Botswana
RDL	Red Data List
ROML	National University of Lesotho Herbarium, Roma, Lesotho
RSA	Republic of South Africa
SABONET	Southern African Botanical Diversity Network
SADC	Southern African Development Community
SDNH	Swaziland National Herbarium, Malkerns Research Station, Mbabane, Swaziland
SNTC	Swaziland National Trust Commission
Spmndb	Specimen Database, used by WIND
SRGH	National Herbarium, Harare, Zimbabwe
TPC	IUCN Threatened Plants Committee
UCBG	University of Botswana Herbarium, Gaborone, Botswana
WIND	National Herbarium, Windhoek, Namibia
WCMC	World Conservation Monitoring Centre
WWF	World Wide Fund for Nature



1



2



3



4



5

1. *Asplenium torrei* (Mount Mulanje, Malawi).
2. *Selaginella subisophylla* (Ntumbachusi Waterfalls, Zambia).
3. *Adiantum reniforme* (Nyika Plateau, Malawi).
4. *Aponogeton ranunculiflorus* (Lesotho).
5. *Isoetes alstonii* (Victoria Falls, Zimbabwe).

(Drawings by Sandie Burrows)





# Introduction

This short introduction will familiarise you with the structure and layout of the *Southern African Plant Red Data Lists*.

## Overview

A regional overview by Janice Golding, SABONET's RDL Coordinator, gives background information on Red Listing in southern Africa and summarises the results for the entire region.

## Country Chapters

Each country's RDL forms a separate chapter of the book, starting with a fact sheet and an overview, followed by the country's red-listed taxa. The fact sheet lists relevant country statistics and also summarises the RDL taxon numbers. Each chapter is identified by a colour-coded bar on the edge of the page, making it easy to find any particular country at a glance.

## Red Data Lists

The list of taxa that follows a country's overview is arranged into three sections: **EXTINCT & THREATENED**, **LOWER RISK**, and **DATA DEFICIENT**. The **EXTINCT & THREATENED** section contains all *Extinct*, *Critically Endan-*

*gered*, and *Vulnerable* taxa. The **LOWER RISK** section comprises all taxa that were rated *Lower Risk*, with both *Near Threatened* and *Least Concern* subcriteria. The **DATA DEFICIENT** section contains all taxa with *Data Deficient* ratings.

IUCN 1994 categories were used for all assessments. A concise guide to the IUCN categories and subcriteria is printed on the inside front cover of the book, making it easy for non-specialists to interpret the IUCN assessments of plants in the lists.

The *Southern African Plant Red Data Lists* book contains information on approximately 4 100 assessments. For ease of use, the taxa are arranged alphabetically under families, which are also arranged alphabetically within each section. Under each taxon name, in addition to the IUCN assessment, the endemism, threats, and distribution of the taxon are given, where these are available. In most cases, there are also additional notes on the taxon.

## Index

A detailed index lists all families, species, and synonyms that are found in the book.

## Appendices

Appendices include the 1994 and 2001 IUCN Red List Categories in both English and Portuguese, as well as the IUCN Guidelines for National Application of IUCN Categories.

## Database on CD

You can also order the full *Southern African Plant Red Data Lists Database*—on which this book is based—from SABONET. The database not only provides all the information contained in the Southern African Plant Red Data Lists book, but also lists additional data, such as extent of occurrence, population size, past decline, and future decline. The database features an easy-to-use search facility, enabling users to find, print, and export information on taxa. If you are interested in ordering the CD, send an e-mail message to [redatallist@sabonet.org](mailto:redatallist@sabonet.org), including the phrase "Red Data List Order" in the subject line, and your name and mailing address in the body of the message. Alternatively, you can send a fax with the same information to (27) 12 804-5979, or write to Red Data List Orders, SABONET, National Botanical Institute, Private Bag X101, Pretoria 0001, South Africa.

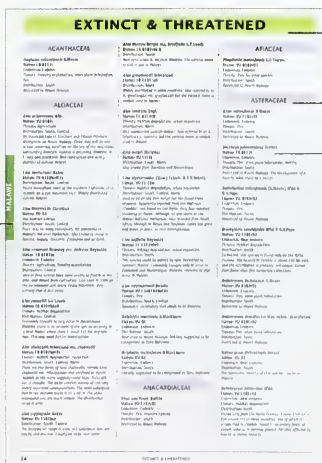


country map

regional overview

colour-coded bar

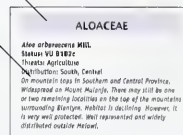
fact sheet



section title

family name

taxon assessment





## Regional Overview

Janice Golding\*

A Red Data List is a catalogue of species whose future survival in nature hangs in the balance. Species that are rare or those that are threatened with extinction are indicators of the state of ecosystem functioning and may signal the impending degeneration of biodiversity. Red Data Lists provide guidelines for *why* and *where* conservation efforts should be concentrated, and operate as an early-warning system at the level of species and their ecosystems.

The *Southern African Plant Red Data Lists* publication was compiled over a 30-month period and documents some 3,900 taxa that are threatened and potentially threatened with extinction in Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe. A total of 4,098 assessments are included. More than 1,960 of these species occur only in a single country (endemic) and 33 are recorded as being extinct. Where possible, Portuguese translations have been made available to accommodate users in Angola and Mozambique.

### Introduction

Hall, De Winter, De Winter & Van Oosterhout (1980) compiled the first plant Red Data List (RDL) in Africa; today, this list is still widely regarded as a milestone publication. It provided RDL accounts for Lesotho, Botswana, South Africa, Swaziland, and the former South West Africa (Namibia). These countries comprise a broad floristic region that is documented in the *Flora of southern Africa* (FSA) (current editor: G. Germishuizen). The FSA region generally covers the area south of the Kunene, Limpopo, and Okavango Rivers. The pioneering work of Hall *et al.* (1980) formed the basis of subsequent RDL

compilations in the FSA region and its neighbouring countries; several subsequent in-country RDLs were produced in South Africa, for example, Hall & Ashton (1983), Hall & Veldhuis (1985), and Fôurie (1986). During this time, the Threatened Plants Committee of the World Conservation Union (IUCN) also compiled lists of species suspected or known to be threatened; these were widely circulated to various countries throughout the southern African region. These lists were never formalised into publications until many years later when more reliable data sets were available.

By contrast to the FSA region, countries to the north of the Kunene, Limpopo, and Okavango Rivers did not produce RDLs during the 1980s. This area—referred to as the *Flora zambesiaca* (FZ) (current editor: G.V. Pope) region—covers Angola, Malawi, Mozambique, Zambia, and Zimbabwe. The FZ region, being more species-depauperate than the FSA region (*ca* 8,000 species compared to *ca* 23,800) (Morat & Lowry 1997), did not have proper plant RDLs prior to 1998, when global plant RDL publications covering the southern African region were published by the IUCN/Species Survival Commission (Walter & Gillett 1998,



**The globally recognisable landscape of southern Africa, showing *Adansonia digitata*. (Photo: NBI)**

Hilton-Taylor 2000a) and the World Conservation Monitoring Centre (Oldfield *et al.* 1998).

The 1990s brought a new era of Red Listing for plant species: compared to the previous decade when RDLs were compiled using herbarium specimen records as a prime source of information, the 1990s tapped a range of new information sources. RDL assessments were based not only on herbarium specimen information, but also on field evidence and participatory consultations with taxonomic specialists, thus producing marginally more robust RDLs, and at the same time also creating more awareness of RDLs. One of the Lists created during this new era—the regional work of Hilton-Taylor (1996a)—is still highly regarded as a flagship publication: it was not only taxonomically more rigorous compared to previous accounts, but also had a far higher number of species on the RDL for Botswana, Lesotho, Namibia, South Africa, and Swaziland. Hilton-Taylor's work was subsequently updated in journals (Hilton-Taylor 1996b, 1997). The most recently published southern African plant RDL was for KwaZulu-Natal Province (South Africa), Lesotho, and surrounding areas (Scott-Shaw 1999). South Africans therefore have a 20-plus year history in compiling RDLs not only for South Africa, but also for its sister countries.

The *Southern African Plant Red Data Lists* publication, produced under the auspices of the Southern African Botanical Diversity Network (SABONET), has been built on this impressive foundation.

### Focal Species

The IUCN/Species Survival Commission

\* SABONET Red Data List Coordinator, Pretoria, South Africa





**C. Hilton-Taylor from the IUCN/SSC at a training course on the application of the IUCN's RDL system. (Photo: A. Romanowski)**

advocates that the RDL status of all species, whether or not they are suspected of meriting RDL status, should be determined to create a benchmark for comparisons (Hilton-Taylor 2000b). The *Southern African Plant Red Data Lists* team was unable to undertake this formidable challenge—which would take many years to achieve—and instead adopted a strategic approach by focussing on certain species only.

*Southern African Plant Red Data Lists* workers placed special emphasis on revisiting the conservation status of species that appeared in previous RDL publications. This presented an opportunity to incorporate new sources of information to determine whether or not the conservation status of a taxon had actually changed with respect to extinction risk, and also provided an opportunity to reassess species that had previously been categorised as *Data Deficient* (no information available to assist in determining the RDL status). Consulting previous RDLs made it possible to combine old and new sets of information.

Species covered in the *Southern African Plant Red Data Lists* include the following:

- Socially and economically important species such as those used for medicinal purposes
- Species known or suspected to be utilised unsustainably
- Indigenous commercial timbers
- Taxonomically poorly known taxa
- Species of special botanical interest such as endemics or range-restricted species
- Species that are subject to poaching

Still, in most cases, rates of exploitation and trade statistics were not readily available, do not exist, are outdated, or incomplete.

Speculative RDL results were optimal in these cases. For example, the harvesting of Zambia's edible orchids, commonly called 'chikanda' or 'African polony', has to date not been formally documented at a species level (Bingham & Kokwe 2001, Ng'uni *et al.* 2001, Golding 2001). Orchid tubers need to be purchased from markets and then cultivated in order to use floristic diagnostics to identify which species are being utilised. In the meantime, field surveys by orchidologists will remain a priority in determining the actual conservation status of Zambian orchids. This classic example epitomises the need for basic levels of information of our region's indigenous resources in order to implement appropriate utilisation strategies. More accurate assessments of utilised species require better data sets that can only be acquired through

a combination of field monitoring and taxonomic efforts. This is an immediate priority, particularly for countries with resource-based economies.

## Methods

### *IUCN RDL System of Categories and Criteria*

The IUCN RDL system of categories and criteria (IUCN 1994) were used for the purposes of this publication (Appendix 1 in English, Appendix 2 in Portuguese). The *Lower-Risk conservation dependent* category was excluded, since species may well be prone to extinction and, simultaneously, their survival may be completely dependent on protective conservation measures. The system used consists of eight categories



**The SABONET RDL Project was launched at a regional workshop held at the National Herbarium in Pretoria, South Africa. (Photo: A. Romanowski)**



**Figure 1. Collaborating partners came from a variety of professional backgrounds.**



ries; the placement of a taxon in each category is justified according to certain criteria that apply. Species assigned as *Critically Endangered*, *Endangered* and *Vulnerable* are considered threatened.

Species were classified according to national guidelines outlined in Gärdenfors *et al.* (1999) (Appendix 3). When making a na-

tional RDL assessment, the entire global population and its interaction with resident national populations should be taken into account, as the dynamics of gamete exchange within a population spanning country borders may influence extinction risks in resident national populations. As a result, a single species may have different RDL assessments in different countries. In

instances where information regarding the population dynamics of a species across country borders was doubtful, allowable inferences and assumptions were made (Gärdenfors *et al.* 1999). Similarly, species categorised as being extinct in one country may not be extinct in another. Endemics (species confined to a particular country) are assigned the same status in global and national RDL assessments. When endemics are classified as extinct, it means that the species no longer exists anywhere or that it is known only *ex situ*.

**Table 1. Key literature references used for compiling the southern African RDL. The references are listed according to order of greatest utility.**

Literature	Relevant countries
<i>Flora zambesiaca</i>	Angola, Malawi, Mozambique, Zambia, Zimbabwe
<i>Flora of southern Africa</i>	Botswana, Lesotho, Namibia, South Africa, Swaziland
<i>Bothalia</i>	Botswana, Lesotho, Namibia, South Africa, Swaziland
<i>Flora of Tropical East Africa</i>	Malawi, Mozambique, Zambia
<i>Kew Bulletin</i>	Southern Africa
<i>Flora de Moçambique</i>	Mozambique
<i>Flowering Plants of Africa</i>	Southern Africa
<i>Kirkia</i>	Zimbabwe
<i>Conspectus floraе angolensis</i>	Angola

**Table 2. Threat categories used in the RDL assessments.**

Afforestation (associated with establishing timber plantations)
Agriculture
Alien plant infestation
Collection (associated with the removal of whole plants, e.g. medicinal, poachers)
Damming
Deforestation (land clearing of woody cover)
Desiccation (drying of wetlands)
Fire
Forestry exploitation (targeted removal of woody species)
Grazing (e.g. goats and cattle) or browsing (e.g. elephants)
Habitat degradation (applied in general or specific terms)
Harvesting (associated with the removal of certain plant parts, e.g. medicinal)
Mining
Pests/pathogens
Road network
Salinisation
Siltation
Soil erosion
Urban expansion (applied to expanding human settlements)

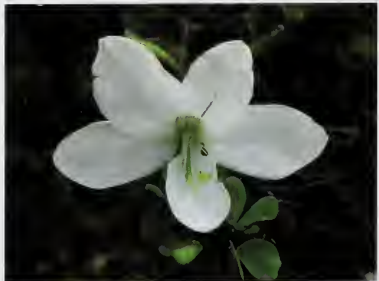
**Table 3. Summary of regional statistics for taxa on the Southern African Plant RDL.**

Category	Number of taxa
Extinct (EX)	32
Extinct in the Wild (EX)	1
Critically Endangered (CR)	138
Endangered (EN)	230
Vulnerable (VU)	1,018
Lower-Risk near threatened (LR-nt)	361
Lower-Risk least concern (LR-lc)	1,130
Data Deficient (DD)	1,188
Not endemic	1,446
Endemics	1,962
Suspected endemics	148
Near-endemics	475
Suspected near-endemics	67
Total number of assessments	4,098

The IUCN (1994) RDL system has in the meantime been refined through extensive consultation and has now been replaced with a new system (IUCN 2001) (Appendix 4, currently unavailable in Portuguese). The most significant difference between the IUCN 1994 system and the IUCN 2001 system is that the latter places greater emphasis on measures of population decline and whether threatening processes contributing to these declines can be alleviated, leading to the stabilisation or recovery of the population (reversible and irreversible population declines). The guidelines for applying this system at a national level have also been updated (Gärdenfors *et al.* 2001) (Appendix 5).

*Sources of Information*

As part of the SABONET RDL programme, training courses and technical workshops were conducted throughout the region, primarily between May 2000 and May 2001. These events provided a foundation for understanding RDL methodology and the opportunity to consult with and obtain consensus from specialists regarding the conservation status of species. This level of consultation, which took place locally, regionally, and internationally, greatly enhanced the quality of the data, as information was reported from the perspective of individuals who had observed species in the



**Bauhinia natalensis is a South African endemic that is more commonly known from cultivation. (Photo: NBI)**



**The ten countries covered by the SABONET RDLs.**

field (Figure 1, p.3). Most collaborators outside the workshops were field ecologists, taxonomists, and, particularly, amateur botanists. Over and above the participation of individuals at the technical workshops

and training courses, the RDL was refined mainly by taxonomists—the voluntary contributions of staff at the National Herbarium in South Africa (PRE), Kew Herbarium (K), and the National Herbarium

**Table 4. Comparison of numbers of species listed in different RDL accounts.**

Country	Oldfield <i>et al.</i> 1998	Walter & Gillett 1998	Hilton-Taylor 2000a	SABONET RDL
Angola	27	30	25	n/a
Botswana	3	7	3	43
Lesotho	0	25	0	94
Malawi	27	61	18	247
Mozambique	78	89	68	300
Namibia	11	75	12	1,152
South Africa	65	2,215	72	948
Swaziland	8	42	8	305
Zambia	14	12	11	505
Zimbabwe	27	100	22	504

**Table 5. The ten families with the highest representation on the Southern African Plant RDL.**

Family	Number of taxa
Orchidaceae	403
Asteraceae	378
Apocynaceae <i>sensu lato</i>	284
Fabaceae	223
Euphorbiaceae	197
Rutaceae	164
Mesembryanthemaceae	161
Asphodelaceae	159
Amariyllidaceae	142
Rubiaceae	129



**The large-sized tubers of edible orchids are preferred and therefore more prone to over-exploitation. (Photo: M.G. Bingham)**

of Zimbabwe (SRGH). Technical support on the IUCN RDL systems was provided by SABONET in consultation with the IUCN/SSC. All these processes collectively contributed to a considerable improvement of data coverage and quality.

Usually, national flora checklists are the logical starting point for the compilation of RDLs. However, with the exception of Namibia (Craven 1999 and updated in Craven 2000a, b) and South Africa (Arnold & De Wet 1993), the participating countries did not possess comprehensive published checklists. The absence of national checklists was a serious obstacle, as there was no logical reference point for species occurrences in a country or the taxonomic identity of the species in question. In lieu of checklists, the next best reference point was thought to be the Flora volumes pertaining to the FZ and FSA regions; FZ region countries relied heavily on FZ volumes as a surrogate for estimating distribution ranges and scarcity. Unfortunately, Flora volumes were found to be of limited value for RDL compilation in Malawi, Mozambique, Zambia, and Zimbabwe. To remedy this limitation, we published a list of recommendations regarding the format of Flora volumes so that Floras would, in future, be more useful for Red Listing and other conservation-related purposes (Golding & Smith 2001).

However, a very positive outcome of using FZ was that many poorly known species documented in FZ (known only from type collections or from a type locality) were included in the *Southern African Plant Red Data Lists*. For example, one of the most extreme cases is that of *Eulophia biloba* Schltr. (Orchidaceae) from Mozambique—it was collected in 1895 and is known only from the type collection. The species was





## SARARES THREATENED TAXON

This taxon is databased. All additions and changes should be sent to the SARARES Project Coordinator, Threatened Plants Project, Conservation Biology, National Botanical Institute, P/Bag X7, Claremont, 7735.

**Creating more opportunities for contributing to the RDLs: stickers used on herbarium sheets alert herbarium users that the species is on the RDL.**

collected in what is now a rapidly expanding coastal town (Beira), but has never been re-collected. There are hundreds of similar examples throughout the southern African region. This certainly highlights the need for greater and more focussed taxonomic activity in southern Africa.

In addition to FZ and FSA, a number of literature sources were found to be extremely useful for Red Listing purposes in southern Africa (Table 1). *Conspectus florum angolensis*, an account of the flora of Angola, has long ceased to be active; civil war and political instability have resulted in botanical work grinding to a halt (Huntley & Matos 1994). After many years of dormancy, *Flora de Moçambique*, an account of Mozambique's flora, is gradually being resuscitated.

### Taxonomy

The taxonomic standard that was applied in the *Southern African Plant Red Data Lists* follows IUCN taxonomic guidelines (Strahm 1998); the most recent taxonomic accounts were used (see Table 1), but occasionally additional sources were sought (Lebrun & Stork 1994-1997; *Index Kewensis*). Recently revised synonyms were only rejected in exceptional circumstances and upon request in situations where updated names are not currently being used in leading botanical institutions. However,

in such instances, this deviation was stated and one or more synonyms provided. This nomenclatural approach fosters a greater understanding and appreciation of RDLs in countries that may only become aware of name changes at a later stage. Author citations follow Brummit & Powell (1992); for authors not in the list, initials and full surnames were used. Further taxonomic problems similar to those detailed by Hilton-Taylor (1996a) were encountered and are not repeated here.

### Threatening Processes

Nineteen categories of threat were used for the RDL assessments (Table 2); these threats are the deleterious causal factors for species decline in southern Africa. The full extent and synergisms (cascading ecological effects) of threatening processes on plant species in southern Africa can be understood only with further scientific analyses and could well form the basis of future policy-based work aimed at alleviating these threatening processes.

### Results

The RDLs included in the *Southern African Plant Red Data Lists* book show that about 3,900 taxa are nationally threatened or potentially threat-

ened with extinction in southern Africa. Some 1,962 of these taxa are endemic—occurring only in a single country—and 33 are recorded as being extinct (Table 3).

There are, in addition, notable differences in the *Southern African Plant Red Data Lists* compared to the following publications:

- Walter & Gillett (1998)—species categorised as globally *Rare*, *Endangered*, *Vulnerable*, and *Indeterminate* according to a now outdated RDL system outlined in Davis *et al.* (1986)
- Oldfield *et al.* (1998)—globally listed tree species according to the IUCN (1994) RDL system
- Hilton-Taylor (2000a)—globally listed (mainly threatened) tree taxa according to the IUCN (1994) RDL system

Although it is inherently problematic to compare the total number of species listed in this publication with previous publications owing to the different RDL systems that were used and different RDL categories that were presented, it nevertheless yields interesting comparisons (Table 4).



**IUCN Red List system of categories and criteria. Left: IUCN (1994) Right: IUCN (2001).**

For example, the number of endemic species, the number of poorly known taxa (poorly represented in herbarium collections), and the number of newly discovered species listed in the *Southern African Plant Red Data Lists* are all higher than the numbers in the publications mentioned above.

Moreover, many problems were experienced during the compilation of the RDL, especially in Angola and Mozambique. More than 25 years of civil war in Angola have made botanical work there acutely cumbersome. Existing botanical information for Angola is scant and outdated, and provides little useful information for RDL initiatives. This is evident even in previous RDLs; for ex-



**Plant RDLs from left to right: Hilton-Taylor (1996a), Walter & Gillett (1998), Oldfield *et al.* (1998) and Hilton-Taylor (2000a).**



ample, out of a list of 32 taxa for Angola, 26 represented the genus *Euphorbia* and more than 65% of these were categorised as *Indeterminate* (Walter & Gillett 1998). Previous RDLs for Angola (Oldfield *et al.* 1998, Walter & Gillett 1998) have been presented as no new information was available.

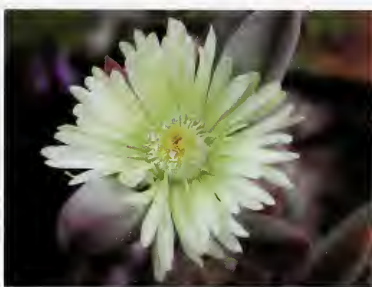
Mozambique, which has also been ravaged by many years of civil war, still has many lacunae of information, as indicated by the high number of species categorised as *Data Deficient* (many range restricted species and country endemics). High proportions of *Data Deficient* species in southern African countries can be generally attributed to poor taxonomy and too low a resolution of field knowledge. Proactive steps should be sought to resolve these impediments. Likewise, the RDL for South Africa is preliminary and part of a continuing process. Hilton-Taylor (1996a) listed 3,268 species for South Africa and the sheer volume of work could not be accommodated within the time constraints of the *Southern African Plant Red Data Lists*. We advise that Hilton-Taylor (1996a,b, 1997) be used in conjunction with this work until such time that the South African RDL is complete.

#### *National versus Global Red Data Lists*

There are various 'for and against' debates for the appropriate geopolitical scale of RDL assessments, but this decision ultimately rests with the country in question. A country-by-country (national) scale was selected as the most effective option for the southern African region.

National assessments capture the local essence (intensity and extent) of threats to species at a greater resolution compared to global assessments. The impact of threats on resident populations may be diluted in global accounts, no matter how destructive these threats may be on national populations. In addition, national assessments provide a more effective vantage point for advocacy and lobbying using national policy and legal instruments. National assessments also promote greater flexibility and participation because countries are able to establish their own conservation agendas in terms of the kinds of species that are represented on RDLs.

On the other hand, global assessments allow for charismatic flagship species to be raised to a higher international profile and hence global-scale work is more attractive



***Astridia citrina* was previously listed as *Rare* by Hilton-Taylor (1996a). (Photo: NBI)**

for funding options and conservation action. Global-scale assessments also provide an opportunity for developing countries to shoulder responsibility and collaborate at the global level. Conversely, these assessments provide the unfortunate possibility of 'passing the buck', that is, to delegate responsibility to countries that, in turn, may not take on responsibilities for conserving RDL species. These issues need to be taken into consideration when RDLs are compiled, because national, regional, and global agendas including social, economic, and political agendas are inevitably reflected in the content of RDLs.

Hilton-Taylor (1996a) warns that a shortcoming of sub-national scale RDLs is that there is a tendency to place emphasis on only certain families or genera. Parochial approaches may lead to an uneven distribution of already limited resources and also result in other, more important, species being overlooked. National, regional, and global RDLs should reflect synergistic attempts for the conservation of threatened species.

#### **Conclusions**

Over the years, better sources of information have become available and technologies have advanced for more efficient con-

solidation and processing of data. Now, more poorly known species, those known only from type collections or from type localities, utilised species, range-restricted species, and endemics have all been included on the *Southern African Plant Red Data Lists*. The inclusion of species known only from single herbarium collections or known only from type localities provides a platform for taxonomic efforts to resolve information on imperfectly known taxa.

The IUCN/SSC—the proponents of RDLs—recommends that RDL compilers work more closely with designated IUCN authorities who will not only endorse *bona fide* RDL compilations, but are also in a position to provide the most up-to-date information (see Hilton-Taylor 2000b). RDL publications that go unchecked may cause confusion regarding the conservation status of species; this creates uncertainty and may pose a setback in instances where conservation action is urgently required. For this reason, any suggested changes (including additions and de-listings) to the *Southern African Plant Red Data Lists* should be logged and integrated into future RDL updates. To date, the compilation of plant RDLs for southern Africa has been intermittent and not part of a continuous process. If serious efforts are to be made to minimise species losses in the southern African region, communication within and between countries on suggested changes to RDLs needs to take place.

Early-warning systems to monitor the status and trends of biodiversity loss play a pivotal role in minimising and preventing species extinctions. An RDL is a sophisticated and universally understood system. The *Southern African Plant Red Data Lists* publication is a technical contribution towards political approaches that are required to retain the region's rich botanical heritage.



***Moraea aristata* is known from a few plants on the Cape Flats, a high-density urban area in the Western Cape Province. (Photo: NBI)**



***Alberta magna*—the Natal Flamebush tree is used for medicinal purposes, is naturally rare and occurs in low numbers. (Photo: NBI)**



## André Dombo,\* Esperança da Costa\* & Georgina Neto\*

### Introduction

The loss of biological diversity is an issue that is a concern for many around the world, because human populations depend on natural plant resources for food, medication, fuel, charcoal, timber, and so forth. Many plant populations have been decreasing and important ecosystems are often destroyed, fragmented, and degraded. Owing to modern factors like pollution, climate change, and alien plant invasions, the added human pressure on natural resources results in many ecosystems being readily and irreversibly destabilised.

Angola has a total area of 1,246,700 km<sup>2</sup> and a coastline of almost 1,650 km in length. Its heterogeneous topography and its equatorial position make Angola one of the richest sub-Saharan countries in terms of floral wealth. Sadly, however, the flora of Angola is poorly understood due to the lack of formal studies of the plant diversity of the country (for example, the Flora volumes of *Conspectus florae angolensis*).

Nevertheless, one of the milestones for Angolan botany was the publication of a

phytogeographic map (*Carta fitogeográfica*) by Gossweiler in 1939. This map was subsequently improved upon by Barbosa (1970). Barbosa used 32 broad vegetation types to describe the floristic diversity of Angola. These vegetation types range from rich tropical forests in the Angolan enclave in the northwest (Cabinda) to the more xeric, unvegetated dunelands in the extreme south (Namibe) (for a summary, see Huntley & Matos 1994). The Angolan flora has affinities with the Zambebian Regional Centre of Endemism, the Guinea–Congolian, Guinea–Congolian/Zambebian, Afromontane, Kalahari Highveld and the Karoo–Namib phytochoria (White 1983). The Zambebian Centre occupies some 80% of the country, particularly the central plateau, which is primarily vegetated by miombo woodlands.

In 1988, Walter & Gillet listed 32 vascular plant species as threatened with extinction. This represents 0.6% of the Angolan flora.

Almost three decades of civil war and military activity have allowed for regeneration in many areas of the Angolan flora. On the other hand, the war has placed pressure on



Landscape of southwestern Angola on the edge of the escarpment, at Tundavala. (Photo: SABONET)

\*Herbarium, ex-Centro Nacional de Investigação Científico, Luanda, Angola

**Capital:** Luanda, largest city and main port

**Area:** 1,246,700 km<sup>2</sup>

**Languages:** Portuguese (official), Kimbundu, Umbundu, Kongo, Chokwe

**Currency:** Kwanza (KZR)

**Total plant species:** 5,185

**Total plant endemics:** 1,260

**Total RDL plants:** no information available

**Focal RDL institutions:** LUAI, PRE

**Number of Protected Areas:** six National Parks, other informal reserves (such as strict, forest, partial, regional, and hunting reserves), and several proposed protected areas.

**Population:** 12,356,900 **Growth Rate:** 2.9% **Density:** 9.4 people/km<sup>2</sup>

**Phytogeography:** Predominantly Zambebian, with longitudinal bands of Kalahari–Highveld and Karoo–Namib in the southwest. Guinea–Congolian pockets interspersed amongst Guinea–Congolian/Zambebian Regional Transition Zone in the northernmost extreme, and Guinea–Congolian in Cabinda. Scattered Afromontane pockets primarily on the interior plateau.

**Flora:** Mainly miombo woodland (and other variants) and grassland savannas, with patches of lowland rainforest in the north. Intermediate elevation forest on the western escarpment, montane forests in the highlands, and arid desert and sub-desert formations in the southwest.

**Sources:** Anonymous 2000, Excell & Gonçalves 1973, Huntley & Matos 1994, Stuart & Adams 1990, White 1983



plant resources for charcoal and fuelwood (Huntley & Matos 1994), as well as a source of foreign exchange. The former is especially evident in the vicinities of densely populated areas with limiting infrastructures, whereas the latter takes place in more remote areas (McNeely 1998).

## Background

### Geomorphology

A relatively narrow strip along the coastline has an altitude of 0–200 m; altitude increases to 1,000 m to 1,500 m and higher in the interior of the country (hill zone). Between 200 m and 1,000 m, the relief of the escarpment is diverse and steep. The largest part of the country lies between 1,000 m and 1,500 m in altitude. The highest point in Angola is Morro do Môco (2,620 m), situated in Huambo Province (central western Angola).

### Climate

There are three large climatic zones in Angola:

- *Tropical humid*, where the precipitation is high
- *Tropical dry*, where the precipitation is low
- *Desert*, where precipitation is very rare and the diurnal temperature range is very wide

Two key factors contribute to this climate pattern: the cold Benguela Current and the high-pressure system from the Atlantic south. These cause precipitation to decrease as latitude and altitude increase. For example, the lowest precipitation values are found in the Namibe Desert in southwest Angola which is situated at latitudes near the centres of these high-pressure cells. The Benguela Current accounts for the streams of cold air in the littoral zone of the southern part of the country. The low air temperatures result in high water vapour concentrations which cross the littoral. The

precipitation in the areas closest to the coastline in the south is thus low. The highest values for annual atmospheric precipitation (orographic) are found in the central hills of the country. The coldest zones are between the central plateau and desert region on the coastline. The hottest zones are areas further north and east.

### Vegetation

The most comprehensive study of the Angolan vegetation to date is that of Gossweiler & Mendonça (1939), which was later updated by Barbosa (1970). Barbosa described 32 vegetation types, with about 100 vegetation subtype descriptions. Out of a total of 5,185 species, 1,260 are estimated to be endemic to Angola, based on a statistical analysis (Gonçalves & Excell 1973, Bamps 1975).

The northern territories of the country are poorly known compared to the south. In Cabinda, several vegetation types predominate and consist of evergreen forest

**Table 1. Threatened species listed by Walter & Gillett (1998); \* denotes endemic taxa.**

Species	Family	Conservation status
<i>Aloe inamara</i> *	ALOACEAE	Rare (R)
<i>Aloe mendesii</i> *	ALOACEAE	Vulnerable (V)
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	Vulnerable (V)
<i>Ceropegia chipiaensis</i> *	ASCLEPIADACEAE	Rare (R)
<i>Encephalartos laurentianus</i>	ZAMIACEAE	Rare (R)
<i>Euphorbia ambacensis</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia atrocarmesina</i> subsp. <i>atrocarmesiana</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia atrocarmesina</i> subsp. <i>arborea</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia berotica</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia caerulans</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia cannellii</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia congestiflora</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia cuneneana</i> subsp. <i>cuneneana</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia cuneneana</i> subsp. <i>rhizomatosa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia dekindtii</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia demissa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia dispersa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia faucicola</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia imitata</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia indurens</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia ingenticapsa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia mvinilungensis</i>	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia nubigena</i> var. <i>nubigena</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia oligoclada</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia opuntiioides</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia scitula</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia semperflorens</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia strangulata</i> subsp. <i>deminuens</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia strangulata</i> subsp. <i>strangulata</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia vallis</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia viduiflora</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Lotononis newtonii</i> *	LEGUMINOSAE: PAPILIONOIDEAE	Rare (R)



physiognomic variations amongst semi-deciduous forest communities. The more important species in Cabinda include *Oxytigma oxyphyllum*, *Terminalia superba*, *Gilletiodendron oogouense*, *Gossweilerodendron balsamiferum*, and *Entandrophragma angolense*. These trees reach heights of over 30 m. These species are also commonly found in northern regions such as Uíge, Bengo, and Cuanza Norte Provinces where species of *Celtis* and *Morus* are widespread.

Savannas cover the largest part of the country and are often described as mosaics of jungles and forests in several vegetation types, particularly in areas near the border with the Democratic Republic of Congo and Zambia. In savannas, as in most open 'forest', tall grasses occur frequently; in mosaic forest/savanna areas (associated with the Guinea–Congolian/Zambezian Phytocoria), species of *Hyparrhenia*, *Andropogon*, *Pennisetum*, and *Panicum* are common. In wooded shrublands, the following species are dominant: *Hymenocardia acida*, *Erythrina abyssinica*, *Piliostigma thonningii*, and *Cussonia angolensis*. In Zaire, Malange, and Lunda Norte Provinces, semi-deciduous closed forests in association with tall grasses are common.

According to Monteiro (1970a, b), herbs

and xerophytes characterise the landscape of Bié. Here, the vegetation typically consists of trees or climbing shrubs, herbs with long, hard leaves and plants with woody rootstocks.

The vegetation of Huíla, Moxico, Lunda, and Malange Provinces is characterised by open forest with *Brachystegia* sp., *Julbernardia paniculata*, *Isoberlinia angolensis*, *Erythrophleum africanum*, *Burkea africana*, *Swartzia madagascariensis*, *Parinari curatellifolia*, *Monotes* sp., *Uapaca* sp., and *Faurea* sp. in several associations (Monteiro 1970a, b). Barbosa (1970) described the vegetation of this region as miombo woodland, a division called vegetation type Number 16. According to Barbosa (1970), miombo in Angola appears at altitudes of 1,450 m and above. The term 'miombo' is a vernacular name that has become generalised to refer to woodland with an abundance of species of the genera *Brachystegia*, *Julbernardia*, and *Isoberlinia*. Sometimes, however, these genera are not dominant owing to destruction by practices such as fire-clearing for agricultural purposes. In these situations, miombo is replaced by secondary savanna. Shrublands may then rapidly be transformed into treeless edaphic grasslands. Referring to this phenomenon, Diniz & Aguiar, (1968) in their Classification of Natural Regions of Angola, state that this belongs



***Cyphostemma juttae* is typical of the landscape near the Angola-Namibia border.**

(Photo: P. Burgoyne)

to Region XI where the climate is mainly dry. Here, *Combretum* species form the wooded savanna with associated grasslands composed of *Hyparrhenia* in low-iron clay soils.

An additional vegetation type in Angola is the mangrove community. Mangroves are in high abundance and diversity in Cabinda and Zaire Provinces and decline in both area of occupancy and dominance further south; they reach the end of their distribution range in Benguela Province where they appear in small patches and then totally disappear in the desert areas of the south. The most important mangrove species are *Rhizophora mangale*, *R. racemosa*, *R. harrisonii*, *Avicennia germinans*, and *Laguncularia racemosa*. Also associated with mangrove communities are species of *Sesuvium portulacastrum* and *S. mesembrianthemoides*.

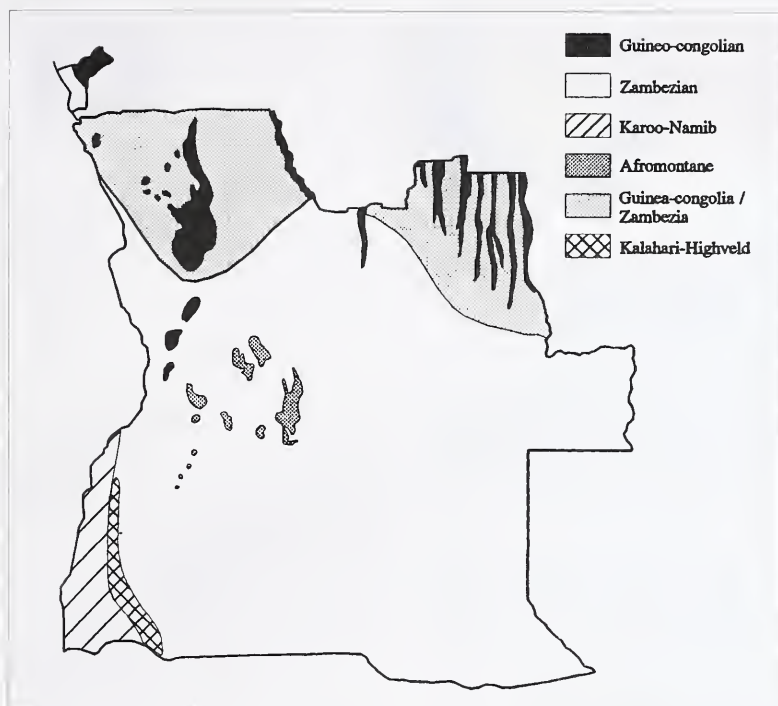
### Red Data Lists for Angola

To date, no local publications that document overutilised species and list their actual conservation status have emanated from Angola. Only two Red Data Lists have been compiled for Angola, namely Oldfield *et al.* (1998) and Walter & Gillett (1998). Both are meaningless for decision-makers in Angola as the latter represents mainly the genus *Euphorbia* (Table 1), whereas the other is based on common and widespread tree species. Both these lists are global.

The 1998 list, compiled by the World Conservation Monitoring Centre (Oldfield *et*

**Table 2. Threatened tree species listed by Oldfield *et al.* (1998).**

Species	Family	Conservation status
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	VU A1cB1B2c
<i>Irvingia gabonensis</i>	IRVINGIACEAE	LR-nt
<i>Azelia bipindensis</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1B2c
<i>Azelia pachyloba</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU A1cd
<i>Albizia ferruginea</i>	LEGUMINOSAE: MIMOSOIDEAE	VU A1d
<i>Baikiaea plurijuga</i>	LEGUMINOSAE: CAESALPINIOIDEAE	LR-nt
<i>Baphia marceliana</i>	LEGUMINOSAE: PAPILIONOIDEAE	VU D2
<i>Brachystegia bakeriana</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1B2c
<i>Dalbergia melanoxylon</i>	LEGUMINOSAE: PAPILIONOIDEAE	LR-nt
<i>Gossweilerodendron balsamiferum</i>	LEGUMINOSAE: CAESALPINIOIDEAE	EN A1cd
<i>Swartzia fistuloides</i>	LEGUMINOSAE: PAPILIONOIDEAE	EN A1cd
<i>Entandrophragma angolense</i>	MELIACEAE	VU A1cd
<i>Entandrophragma candollei</i>	MELIACEAE	VU A1cd
<i>Entandrophragma cylindricum</i>	MELIACEAE	VU A1cd
<i>Entandrophragma utile</i>	MELIACEAE	VU A1cd
<i>Khaya anthotheca</i>	MELIACEAE	VU A1cd
<i>Khaya ivorensis</i>	MELIACEAE	VU A1cd
<i>Lovoa trichilioides</i>	MELIACEAE	VU A1cd
<i>Turraeanthus africanus</i>	MELIACEAE	VU A1cd
<i>Milicia excelsa</i>	MORACEAE	LR-nt
<i>Prunus africana</i>	ROSACEAE	VU A1cd
<i>Hallea ledermannii</i>	RUBIACEAE	VU A1c
<i>Hallea stipulosa</i>	RUBIACEAE	VU A1cd
<i>Nauclea diderrichii</i>	RUBIACEAE	VU A1cd
<i>Haplocoelopsis africana</i>	SAPINDACEAE	DD



**Vegetation map of Angola. (Source: Huntley & Matos 1994)**

*al.* 1998), represents only tree species (Table 2). Most of these are common in miombo woodland or well-known from other countries. From an Angolan viewpoint, none, with the exception of one or two, merit Red Data List status.

### Threats to Plant Species in Angola

The following cultural practices have direct effects on the Angolan vegetation:

- Use of firewood and charcoal
- Use of several plant species for medicinal

purposes, traditional local rites, and ornamental purposes

- Trade in timber species
- Use for local construction

According to the International Strategy for Biological Diversity (1994), the following factors account for the degeneration of biological diversity:

**Destruction and Fragmentation of the Environment** There are few undisturbed ecosystems as a result of increased dependence on vital natural resources. The key

causes for destruction of Angolan tropical forests are the expansion of small-scale subsistence agriculture and the extension of road networks for the timber trade.

**Introduction of New Species** The introduction of new species with invasive properties, often from other countries, is responsible for the extinction of several species, in particular on island landmasses or in centres of diversity and endemism. Isolated ecosystems are more prone to invasions since aliens have a competitive advantage over indigenous species.

**Over-Exploitation of Plant and Animal Species** Several forest species have been over-exploited until near-extinction. The collection of food resources has resulted in many important indigenous species dropping to very low numbers.

Much of the habitat degradation in Angola occurs along the coastline near human settlements. These areas are generally isolated from military activities, which are concentrated in the central plateau areas of Angola. Extensive habitat degradation is expected to be taking place in remote small towns and villages in the interior of the country since extreme starvation and malnourishment of people appear to be on the increase in these areas. People are dependent on natural resources as food supplies are often cut due to the war. Despite the war, important tree species are being logged at unprecedented levels, primarily by powerful multinational companies. The impact of logging activities on tree species cannot be estimated in Angola, although *Gossweilerodendron balsamiferum* from the Cabinda area was categorised as EN A1cd (Oldfield *et al.* 1998). In addition, important fuelwood species in towns and small villages are rapidly being depleted.

There is no national information available that can be used in the compilation of Red Data Lists for Angola.



**Landscape south of Luanda. (Photo: SABONET)**



***Dalbergia melanoxylon* wood carvings are common at market places. (Photo: NBI)**





## André Dombo,\* Esperança da Costa\* & Georgina Neto\*

### Introdução

A destruição da diversidade biológica é uma das crises que preocupa o mundo. A preocupação sobre o estado dos recursos biológicos do qual depende significativamente a vida humana está aumentando. Muitas espécies diminuem rapidamente à níveis populacionais críticos, habitats importantes são frequentemente destruídos, fragmentados e degradados, e vários

ecossistemas são desestabilizados através da poluição, de mudanças do clima, de espécies invasoras e através da pressão directa que o homem exerce na natureza.

Angola é um País que se situa no hemisfério sul do continente Africano, com uma superfície de 1,246,700 km<sup>2</sup>. A fronteira marítima de Angola é de 1,650 km de costa. As características geográficas e a sua localização, tornam-no um país com uma das

mais ricas diversidade vegetal na África subsahariana, porém, insuficientemente conhecida pois poucos são os estudos efectuados sobre a diversidade botânica do País (por exemplo, *Conspectus Florae angolense*) Da bibliografia existente destaca-se a *Carta fitogeográfica* de Gossweiler (1939), melhorada mais tarde por Barbosa (1970). Segundo Barbosa (1970) cerca de 32 tipos de vegetação, podem ser considerados em Angola, desde as florestas húmi-

**Tabela 1. Apesar de até agora não existir publicações locais que retratem o actual estado de conservação da flora nacional, na sua publicação de 1997 (Walter & Gillett 1998), a IUCN apresenta a seguinte lista de plantas ameaçadas em Angola [\* = endémico].**

Espécie	Família	Estado de conservação
<i>Aloe inamara</i> *	ALOACEAE	Rara (R)
<i>Aloe mendesii</i> *	ALOACEAE	Vulnerável (V)
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	Vulnerável (V)
<i>Ceropegia chipiaensis</i> *	ASCLEPIADACEAE	Rara (R)
<i>Encephalartos laurentianus</i>	ZAMIACEAE	Rara (R)
<i>Euphorbia ambacensis</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia atrocarmesina</i> subsp. <i>atrocarmesiana</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia atrocarmesina</i> subsp. <i>arborea</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia berotica</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia caerulans</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia cannellii</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia congestiflora</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia cuneneana</i> subsp. <i>cuneneana</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia cuneneana</i> subsp. <i>rhizomatosa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia dekindtii</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia demissa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia dispersa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia faucicola</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia imitata</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia indurens</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia ingenticapsa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia mwinilungensis</i>	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia nubigena</i> var. <i>nubigena</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia oligoclada</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia opuntoides</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia scitula</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia semperflorens</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia strangulata</i> subsp. <i>deminuens</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia strangulata</i> subsp. <i>strangulata</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia vallis</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia viduiflora</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Lotononis newtonii</i> *	LEGUMINOSAE: PAPILIONOIDEAE	Rara (R)

\*Herbarium, ex-Centro Nacional de Investigação Científico, Luanda, Angola



das de Cabinda até as zonas semiáridas do Namibe. Entretanto outros autores foram se destacando em obras relevantes como sendo Monteiro (1970a, b) que descreve ao pormenor a vegetação do Bié com relevância na vegetação do tipo Miombo.

Segundo a tipografia de vegetação de White (1983), os seguintes tipos fision/omícos podem ser encontrados Guineo-Congolês, Zambeziaco, Afro-Montanhas, Karoo-Namibe, de Transição Guineo-Congolês/Zambeziaco e a de Transição de Estepes do Kalahari; dentre elas, a do domínio Zambeziaco ocupa cerca de 80% da extensão territorial (Huntley & Matos 1994).

Na lista da IUCN sobre plantas ameaçadas de extinção, Angola é citada como tendo 32 espécies de plantas vasculares ameaçadas (Walter & Gillet 1998), representando este número 0.6% da sua vasta flora que possui cerca de 5,185 espécies diversas. Se por um lado a situação guerra que vem devastando o País há mais de três décadas terá trazido determinados benefícios em relação a regeneração da flora nacional em determinados pontos do País (Huntley & Matos 1994), não é menos verdade afirmar que, terá trazido por outro lado, consequências negativas, particularmente nas áreas pró-

ximas dos grandes centros urbanos onde a concentração da população é maior, e por conseguinte, onde também é maior a procura do combustível (McNeely 1998).

## Generalidades do País

### Geomorfologia

O País possui uma estreita faixa de planície as altitudes variando de 0–200 m no litoral, elevando-se até aos 1,000 m nas zonas de montanhas, continuando a subir até aos 1,500 m. A faixa dos 200 aos 1,000 m é considerada zona subplanáltica de relevo muito heterogêneo. A faixa dos 1,000–1,500 m ocupa a maior parte do território Nacional e é considerada fundamentalmente zona planáltica de relevo pouco acidentado. Entretanto Angola possui regiões de altitudes superiores a 2,000 m são as designadas zonas de cadeia de montanhas. O ponto mais alto é o Morro do Môco que se situa na província do Huambo e que atinge 2,620 m.

### Clima

Em todo País pode ser localizado três grandes zonas climáticas:

- Zona de clima tropical húmido, onde a

estação das chuvas prevalece à seca

- Zona de clima tropical seco, onde a estação seca é maior que a das chuvas
- Zona de clima desértico quente onde a precipitação é muito escassa quase ausente e as amplitudes térmicas diurnas são elevadas

Em Angola há dois factores que condicionam o clima: a corrente fria de Benguela proveniente do Sul eo centro de altas pressões do Atlântico Sul. As precipitações diminuem em geral à medida que aumenta a latitude e a altitude. Os valores mais baixos para a precipitação atmosférica encontram-se no SW de Angola, no deserto de Namibe, onde a latitude e a corrente fria de Benguela se conjugam para provocar grande secura de ar. Tal deve-se a que o deserto do Namibe se situa a uma latitude próxima do Centro de altas pressões tropicais, sendo por isso atingido, durante quase todo o ano, por massas de ar continental e seco vindo desse centro de altas pressões. Entretanto para todo litoral a acção da corrente fria de Benguela faz-se sentir, a qual devido a a sua baixa temperatura não origina grandes concentrações de vapor de água nas massas de ar que a atravessam. Sendo que todo o litoral atingido pela corrente fria de Benguela apresenta também valores pouco elevados para as precipitações atmosféricas anuais.

Os valores máximos de precipitação atmosférica anual verificam-se na zona central da montanha marginal. As regiões mais quentes são áreas de baixa altitude localizadas a leste de Luanda. A região mais fria compreende o planalto central e a zona desértica ao longo da costa.

### Vegetação

Um dos grandes estudos de vegetação até hoje conhecido é de Gossweiler & Mendonça (1939) adaptado mais tarde por Barbosa (1970). No seu estudo Barbosa descreve 32 tipos de vegetação (descritos em anexo) considerando ainda vários subtipos. Baseado em análises estatísticas, foi estimado que 1,260 espécies endêmicas ocorrem em Angola (Gonçalves & Excell 1973; Bamps 1975). Embora os tipos de vegetação incluam todo País, a parte Norte está mal estudada. Em Cabinda são descritos os tipos que incluem florestas sempre verdes como tipo fisionómico predominante. As espécies mais importantes em Cabinda incluem *Oxystigma oxyphyllum*, *Terminalia superba*, *Gilletiodendron oogouense*, *Gossweilerodendron balsamiferum*, e *Entandrophragma angolense*. Também este

**Tabela 2. Esta lista tem representadas somente espécies de árvores (Oldfield et al. 1998), muitas delas conhecidas do Miombo e/ou conhecidas de outros países.**

Espécie	Família	Estado de conservação
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	VU A1 c B1 B2c
<i>Irvingia gabonensis</i>	IRVINGIACEAE	LR-nt
<i>Azelia bipindensis</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1 B2c
<i>Azelia pachyloba</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU A1 cd
<i>Albizia ferruginea</i>	LEGUMINOSAE: MIMOSOIDEAE	VU A1 d
<i>Baikiaea plurijuga</i>	LEGUMINOSAE: CAESALPINIOIDEAE	LR-nt
<i>Baphia marceliana</i>	LEGUMINOSAE: PAPILIONOIDEAE	VU D2
<i>Brachystegia bakeriana</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1 B2c
<i>Dalbergia melanoxylon</i>	LEGUMINOSAE: PAPILIONOIDEAE	LR-nt
<i>Gossweilerodendron balsamiferum</i>	LEGUMINOSAE: CAESALPINIOIDEAE	EN A1 cd
<i>Swartzia fistuloides</i>	LEGUMINOSAE: PAPILIONOIDEAE	EN A1 cd
<i>Entandrophragma angolense</i>	MELIACEAE	VU A1 cd
<i>Entandrophragma candollei</i>	MELIACEAE	VU A1 cd
<i>Entandrophragma cylindricum</i>	MELIACEAE	VU A1 cd
<i>Entandrophragma utile</i>	MELIACEAE	VU A1 cd
<i>Khaya anthotheca</i>	MELIACEAE	VU A1 cd
<i>Khaya ivorensis</i>	MELIACEAE	VU A1 cd
<i>Lovoa trichilioides</i>	MELIACEAE	VU A1 cd
<i>Turraeanthus africanus</i>	MELIACEAE	VU A1 cd
<i>Milicia excelsa</i>	MORACEAE	LR-nt
<i>Prunus africana</i>	ROSACEAE	VU A1 cd
<i>Hallea ledermannii</i>	RUBIACEAE	VU A1 c
<i>Hallea stipulosa</i>	RUBIACEAE	VU A1 cd
<i>Nauclea diderrichii</i>	RUBIACEAE	VU A1 cd
<i>Haplocoelopsis africana</i>	SAPINDACEAE	DD



***Welwitschia mirabilis*, also found in Namibia, is extremely abundant in the Namibe Province of Angola. (Photo: P. Burgoyne)**

tipo de vegetação é encontrado em regiões da província do Uíge, do Bengo e Cuanza Norte onde espécies de *Celtis* sp. e *Morus* sp.

As savanas cobrem a maior parte do território muitas vezes descritas em vários tipos de vegetação como mozaico com bosques e florestas. Nas savannas é frequente a presença de gramíneas de altura elevada maioritariamente ligada a florestas abertas. Em mosaicos florestas savanna é frequente as gramíneas de baixo porte onde se encontram espécies de vários géneros como: *Hyparrhenia*, *Andropogon*, *Pennisetum* e *Panicum*. Também a estas formações é notória a presença de arbustos lenhosos como *Hymenocardia acida*, *Erythrina abyssinica*, *Piliostigma thonningii* e *Cussonia angolensis*.

Na província do Zaire, Malange e Lunda Norte encontram-se as florestas Serradas Semidecíduas em associação com gramíneas altas. A vegetação da região da Huíla enquadrada no domínio zambesiaco dentro da classificação dos territórios fitogeográficos de Angola. Monteiro (1970a, b), refere que a paisagem desta região caracteriza-se pela dominância de agrupamentos herbosos e xerofíticos em graus diversos, com árvores ou arbustos tropófitos, as ervas cespitosas de pouca altura, com folhas longas e rígidas e plantas com as partes subterrâneas fortemente lenhificadas com a forma de volumosos xilopódios. Dentro das divisões propostas para este domínio, esta região enquadra-se no Sector Huíla-Moxico-Lunda-Malange e é caracterizado por uma floresta aberta (do tipo miombo), de maior porte e com dominância de *Brachystegia* sp.,

*Julbernardia paniculata*, *Isobrerlinia angolensis*, *Erythrophleum africanum*, *Burkea africana*, *Swartzia madagascariensis*, *Parinari curatellifolia*, *Monotes* sp., *Uapaca* sp., *Faurea* sp., etc. em associações diversas (Monteiro 1970a, b).

Na Carta Fitogeográfica de Angola, Barbosa (1970), caracteriza a vegetação desta região, como sendo do tipo miombo, enquadrando-a no Tipo de Vegetação nº 16 dentro da divisão fitogeográfica por ele feita; e refere-se que, miombo é o nome vernáculo que se tornou mais generalizado na literatura especializada, para designar os bosques (woodland) com abundância de exemplares dos géneros *Brachystegia*, *Julbernardia* e *Isobrerlinia*. Segundo este autor, é a cerca de 1,450 m de altitude, que começa este tipo de vegetação, com bosques de *Brachystegia*, *Julbernardia* e *Berlinia* que dominam o miombo. Só não dominam, quando são destruídos pela agricultura itinerante, sendo substituídos por savanas secundárias. Entre estes bosques surgem repetidamente, áreas de savana de natureza edáfica (anharas) não secundárias.

Ao referir-se à vegetação desta região, Diniz, (1973) refere-se que, na observação do esboço por ele realizado, ressalta que, a floresta aberta ou “mata da panda”, com carácter de dominância total na metade N-NE, relacionado com os solos ferralíticos muito espessos e tipos climáticos húmido e sub-húmido, vai gradualmente cedendo lugar a formações mais secas com fácies de mato cerrado de difícil penetração; para o sul do paralelo da Chibia a formação de mato cerrado assume paulatinamente o aspecto fisionómico de balcedo. Na classi-

ficação das Regiões Naturais de Angola (Diniz & Aguiar 1968), está enquadrada na Região IX com uma vegetação predominantemente caracterizada por uma floresta aberta de *Isobrerlinia*, *Brachystegia*, *Julbernardia* à qual se associa na orla sul, de clima mais seco, diversos *Combretum* sp, por vezes formações de savana arbustiva com estrato graminoso de *Hyparrhenia*, em solos fracamente ferralíticos argilosos.

Um tipo de vegetação particular são as comunidades de mangal. Em Angola os mangais atingem o seu maior desenvolvimento nas províncias Cabinda, Zaire e vão perdendo progressivamente importância, tanto em área ocupada como em porte das dominantes, até se esbaterem em pequenas formações na província de Benguela e desaparecerem praticamente nas áreas desérticas do Sul. Nestes mangais destacam-se principalmente um estrato arbóreo com zonagem constituído por *Rhizophora mangle*, *R. racemosa*, *R. harrisonii*, *Avicennia germinans* e *Laguncularia racemosa*. Constituindo a orla do mangal encontramos um estrato constituído na sua maioria por *Sesuvium portulacastrum* e *S. mesembrianthemoides*.

### **Alguns Aspectos Ligados a Legislação Sobre a Conservação da Vegetação em Angola**

A legislação sobre a conservação da natureza em Angola foi inicialmente consolidada pela Administração Colonial Portuguesa através do Decreto nº 40.040 (1955), onde vêm estabelecidos os princípios básicos para a Conservação do solo, flora e fauna (Huntley & Matos 1994), inscrevendo-se deste modo no movimento internacional de protecção dos recursos naturais. Este Decreto foi posteriormente complementado pelo Regulamento Florestal, das Províncias de Angola, Moçambique e Guiné (Decreto nº 44531).

O Artigo 31º, O Decreto 40.040 estabelece que, as zonas de protecção podem ser parques nacionais, reservas naturais integrais, reservas parciais e reservas especiais. Ao passo que, o Artigo 2º do Regulamento Florestal (Decreto nº 44531), divide as formações vegetais em naturais e artificiais, compreendendo estas, as matas construídas artificialmente com espécies autóctones ou exóticas e sujeitas normalmente aos métodos da silvicultura intensiva; e aquelas, as florestas naturais e a savanas, em todas as suas gradações e as estepes.



Na legislação em referência, definem-se os seguintes objectivos sobre a protecção da flora:

- Assegurar a manutenção de biótipos aos quais está ligada a sobrevivência de espécies animais e vegetais
- Manter as condições necessárias a existência de biótipos primitivos não alterados
- Manter povoamentos representativos dos tipos fundamentais dos diversos domínios florísticos
- Evitar a destruição de maciços florestais considerados de interesse público ou científico

No Artigo nº 41º do Decreto 40.040, recomenda-se que diplomas especiais regularão o aproveitamento de espécies vegetais espontâneas para fins utilitários, quando haja perigo de depredação ou extinção delas, e bem assim providenciarão quanto ao fomento que se torne necessário. Conclui recomendando que as concessões de terrenos para fins agrícolas, pastorais ou florestais deverão atender à função económica da floresta e do revestimento vegetal, observando os seguintes princípios:

- Protecção e conservação da flora espontânea ou cultivada e seu metódico aproveitamento, de forma a aumentar a sua produtividade
- Criação de novos recursos florestais
- Reconstituição da floresta em áreas antes arborizadas
- Derrube mínimo de árvores na ocupação de terrenos para qualquer fim
- Protecção dos cursos e nascentes de água
- Fixação de dunas e defesa de invasão de areias

Na actual era (pós-independência), Angola possui como áreas protegidas as que figuram no mapa 1. Em termos de legisla-

ção apesar de ainda estar em vigência, tem vindo a ser adequada de acordo com a actual realidade do País. Através da Lei de Bases do Ambiente de 1999, o Estado Angolano privilegia a definição de políticas ambientais que correspondam à uma nova consciência global, com o objectivo não só de renovar ou utilizar correctamente os recursos naturais disponíveis, garantindo assim o desenvolvimento sustentado de toda a humanidade, como também assegurar, permanentemente, a qualidade da vida dos cidadãos. Esta lei tornou-se assim, num instrumento jurídico básico que serve de suporte válido para o surgimento de instrumentos específicos que regularão a protecção das espécies vivas no País.

### Listas de Plantas Ameaçadas em Angola

Somente duas listas vermelhas foram compiladas para Angola, Oldfield *et al.* (1998) e Walter & Gillett (1998). Ambas são pouco significativas para os decisores angolanos pois nelas apenas estão listadas Euphorbias. Ambas listas são globais.

### Principais Causas de Ameaça das Plantas em Angola

Os hábitos sócio- culturais com influência directa na vegetação da região estudada são:

- Uso da lenha e do carvão como combustível
- A exploração de várias espécies vegetais para fins medicinais, ritos tradicionais locais e ornamentação
- Corte de árvores para aproveitamento da madeira e
- Construção de casas e cabana

Na publicação sobre a Estratégia Mundial da Biodiversidade (UICN 1994), estão identificados os seguintes factores que po-

dem provocar a destruição da biodiversidade:

### Destruição e Fragmentação dos Meios

A superfície dos ecossistemas relativamente não perturbados diminuiu de forma espectacular no decurso das últimas décadas com o aumento da população humana e do consumo de recursos naturais. Com efeito, uma das causas da destruição das florestas tropicais é a expansão da agricultura de subsistência e em muitas regiões a comercialização da madeira.

### Introdução de Espécies Novas

As espécies introduzidas são responsáveis de extinções de várias espécies, em particular nas ilhas. Nos ecossistemas isolados, um novo predador ou competidor pode rapidamente pôr em perigo espécies que não tenham co-evoluído com espécie introduzida.

### Exploração Exagerada de Espécies Animais e Vegetais

Vários recursos florestais vêm sendo explorados exageradamente até a sua extinção. A colheita dos recursos alimentares pelo homem é responsável de várias extinções.

A maior parte da degradação dos habitats ocorre ao longo da zona costeira a qual é um espaço seguro devido a situação de guerra em que o País vive. Esta degradação ocorre maioritariamente nas áreas centrais do País (nas planícies). Espera-se que a maior parte da degradação dos habitats aconteça em pequenas cidades e vilas no interior do País. A população está dependente dos recursos naturais porque as reservas alimentares diminuíram devido a guerra. O abate de espécies de árvores é feito em primeiro lugar pelas grandes companhias internacionais. O impacto deste abate não pode ser razoavelmente estimado, embora a espécie *Gossweilerodendron balsamiferum* da área de Cabinda tenha sido categorizada como EN A1cd (Oldfield *et al.* 1998). Espécies lenhosas importantes nas pequenas cidades e vilas estão desaparecendo rapidamente mas devido ao facto de não existir informação nacional não é possível compilar uma lista vermelha para as referidas espécies.



Flood plain along the Kwanza River. (Photo: SABONET)



Moffat P. Setshogo\* & Bruce Hargreaves†

**Capital:** Gaborone, largest city.

**Area:** 581,730 km<sup>2</sup>

**Languages:** English, Tswana (both official)

**Currency:** Pula (P)

**Total plant species:** 2,151

**Total plant endemics:** 15

**Total RDL plants:** 43

**Focal RDL institutions:** UCBG, PRE

**Number of Protected Areas:** three National Parks, one Transfrontier Park (Botswana-Namibia-South Africa), several Game Reserves and other formally protected areas

**Population:** 15,881,220

**Growth Rate:** 1.7% **Density:** 2.7 people/km<sup>2</sup>

**Phytogeography:** Zambezan in the north and east, and Kalahari-Highveld in the remainder of the country.

**Flora:** Open wooded grassland and deciduous bushland in the south-west on Kalahari sands. Zambezan woodland in the north and east, with extensive wetlands in the Okavango Delta and halophytic flora in the Makgadigadi Pan.

**Sources:** Anonymous 2000, Stuart & Adams 1990

## Introduction

The first attempt at compiling an RDL for Botswana was that by Hall *et al.* (1980) in the *Red Data List of southern African plants*. This list was subsequently updated by Hilton-Taylor (1996a) for vascular plants of the *Flora of southern Africa* (FSA) region. The late Peter Smith (of PSUB) started on an RDL for Botswana; his draft was consulted extensively during the compilation of this list. The present study therefore builds on these lists using 1994 IUCN RDL categories (IUCN 1994).

To date, no national checklist has, however, been compiled for the estimated 2,800 plant species of Botswana. Barnes & Turton (1986) and Arnold & De Wet (1993) represent attempts at compiling national checklists, but these authors consider only herbarium specimens of holdings in Botswana and Pretoria (South Africa), respectively. Similarly, there have been no vegetation studies done in recent times. Vegetation maps generally date as far back as the late 1960s and early 1970s (Wild & Fernandes 1968, Weare & Yalala 1971). Very little ecological research has been done on the plants of Botswana; studies have tended to concentrate on plants of unique ecosystems such as the Okavango Delta and the sand dunes of southern Botswana. This lack of sufficient background material has made compiling the national Red Data List a difficult undertaking.

## Methods

Various information sources were used for compiling the RDL for Botswana. The process began with consultative meetings held with various stakeholders and individuals in Botswana in early 2000. Information was also sourced from PRECIS. During a final workshop held in September 2001 all the information was consolidated.

The study looked at the RDL status of plants within the political boundaries of Botswana. Comparisons were made with the status in neighbouring countries if the plant species was known to occur in these countries.

## Results and Discussion

### *Number of Species on the RDL*

A summary of the general status of species on the RDL is given in Table 1. A total of 43 species appears on the RDL; this represents a small proportion of the flora of Botswana. The majority of the species are *Data Deficient*.

The low number of species represented on the RDL for Botswana can be explained as follows. The Botswana landscape is homogeneous with a fairly undiversified flora. The topography is relatively flat and uniform, with gentle undulations and occasional

**Table 1. Status of RDL species.**

RDL status	Number of taxa
Critically Endangered (CR)	0
Endangered (EN)	3
Vulnerable (VU)	10
Lower-Risk near threatened (LR-nt)	4
Lower-Risk least concern (LR-lc)	4
Data Deficient (DD)	22
<b>Total</b>	<b>43</b>

\*University of Botswana, Gaborone, Botswana

†National Herbarium, Gaborone, Botswana



**Table 2. Endemism in Botswana.**

Endemism	Number of taxa
Confirmed endemic	6
Suspected endemic	9
<b>TOTAL</b>	<b>15</b>

rocky outcrops, mostly along the eastern hardveld. These habitats provide no special refuges for a high diversity of plant species. Species tend to be widespread throughout the country and well-represented in the flora of adjacent countries. Another plausible reason may be that the flora of Botswana is understudied, resulting in very few species on the RDL. Similarly, Hilton-Taylor (1996a) listed only 16 species on the RDL for Botswana (excluding the *Not Threatened* and *Indeterminate/Uncertain* categories).

The number of *Data Deficient* species on this RDL also shows that sufficient information is lacking for many Botswanan plants. These species are mainly known from their type localities and from herbarium collections. There is therefore a need to do more fieldwork on these species (more collections in herbarium cupboards and *in situ* monitoring) and to undertake intensive taxonomic and ecological studies in the country. Some species are known only from records in herbaria of other countries (such as PRE) or from computerised collections (PRECIS). There needs to be an exchange and sharing of information between Botswana and other countries in the region, especially with Namibia (WIND) and South Africa (PRE).

In contrast to neighbouring countries, the level of endemism in Botswana is low; only six species are recorded in this study as being strictly confined to Botswana and a further nine are suspected of being endemic to Botswana (Table 2). Endemic species tend to occupy unique habitats peculiar to certain topographies. Their distribution would theoretically be limited to these habitats. As mentioned earlier, the topography and climate in Botswana are somewhat uniform. Known endemics are recorded mostly from southern Botswana. The topography in the south is not markedly different from the north, but what differs substantially from north to south is the rainfall gradient. Mean annual rainfall generally ranges from over 650 mm in the extreme north to less than 250 mm in the south (Government of Botswana 1998). This suggests that rainfall may be a key environmental variable for the distribution of species in Botswana. There are no near-

endemics (known from an adjacent area of a neighbouring country) recorded for Botswana.

### *Nature of Species on the RDL*

The RDL contains only a few tree species, namely *Acacia hebeclada* subsp. *chobiensis*, *A. hebeclada* subsp. *tristis*, and *Erythrophysa transvaalensis*. Most plants on the RDL are herbaceous, with the families Orchidaceae, Apocynaceae, and Asclepiadaceae particularly well-represented. A number of reasons could be advanced for this distribution, the most important of which is human bias and the fact that there is so much more information about these groups. Furthermore, these families, especially the orchids, have well-known charismatic species. Most trees in Botswana are common, with a wide distribution both within and outside the country. There are legally protected tree species that occur on state-owned forest reserves; these include *Pterocarpus angolensis*, *Baikiaea plurijuga*, *Azelia qnanzensis*, and *Gnibonrtia coleosperma*. These trees, though included in the *World list of threatened trees* (Oldfield *et al.* 1998), do not appear on the national RDL because they are currently not a problem and, at this stage, are viewed as inappropriate for a national threatened list. In the future, however, these species may become candidates for a national RDL.

On the other hand, more medicinal plants were expected to occur on the RDL. However, little information is available for medicinal plants, except for *Harpagophytum* species. Even for these highly exploited species, there are no reliable data for the entire populations of the species in the country (for example, rates of exploitation and rate of recruitment), because most studies are site-specific. There is a high likelihood that more species are being unsustainably exploited, particularly during this time when many people turn to traditional healers who claim to have cures for HIV/AIDS. It is also difficult to obtain information from traditional healers about the plants they use in their practices.

### Conclusions

The main threat to the plants of Botswana is livestock grazing. Most of the rangelands are used for communal grazing. There is also the impact of elephants in the forest reserves. As far as human-induced impacts are concerned, these are still low. There is, nevertheless, a future potential due the expansion of built-up areas.

The effect of invasive species is not yet a major problem in Botswana. There are currently two species that are potential invaders: the grass *Cenchrus biflorus* and the legume *Prosopis glandulosa*. *C. biflorus* affects yield production in pasturelands. *P. glandulosa* occupies most of the dry riverbeds of the Molopo River and is slowly spreading in the Matsheng villages in the northern Kgalagadi District.

More work needs to be done on the *Data Deficient* species on the RDL. A national checklist, which includes distributions of the species in the country, is currently being compiled. This checklist will be of significant use in future RDL compilations.

Much information about the flora of Botswana is scattered in major herbaria in the region and overseas. Exchange of information and collaborative research with herbaria such as K, PRE, SRGH, and WIND would lead to more publications about the plants of Botswana.

Overall, Botswana is fortunate that its flora is still intact. There is little pressure on its natural resources. This therefore provides time to devise appropriate means for minimising threats on biodiversity.

**Acknowledgements** We wish to acknowledge the late Mr Peter Smith for his contribution towards this national RDL. The following people are thanked for useful discussions: Mrs Queen Turner, Dr Lilian Turton and Dr David Parry. The list was compiled by Janice Golding.



***Hyphaene petersiana*, a common palm in the Okavango Delta.**  
(Photo: M.P. Setshogo)

# EXTINCT & THREATENED

## APOCYNACEAE

### *Adenium boehmianum* Schinz

Status: EN D

Very distinctive-looking plant. Apparently known from only a single Botswana field observation in the hills of Kuke Gkonzi; no herbarium records for this species. Known only from a few individuals. There are varying reports that the species in Botswana may possibly represent a new taxonomic entity. It is known mainly from Namibia where herbarium records exist for it.

### *Adenium oleifolium* Stapf

Status: VU B1B2ce

Threats: Harvesting, collection

Sought after by collectors and used as a medicinal plant. Ointment made from the plant is used for snake and scorpion bites, and a root extract is used for tonics and treating fevers. Rare and definitely requires protection. Is also found in the San Kolahori and Namibia. It has a massive turnip-shaped tuber with a tuft of aerial succulent stems and leaves. Spectacular tubular pink flowers.

## ASCLEPIADACEAE

### *Hoodia lugardi* N.E.Br.

Status: VU A1de

Threats: Harvesting, collection

This species has been subsumed as *H. currorii*, but this name is not in use in Botswana. In Botswana, the distribution of this taxon is an east-west belt spanning 600 km. Found in the Kgilagodi Game Reserve. Several localities have been lost due to diamond mining. This plant also has ethnomedicinal value, and has been the subject of intense bioprospecting for the commercial market. Several localities have been extirpated due to the activity of a snout beetle pest. Found in South Africa, Zimbabwe, and elsewhere.

### *Huernia levyi* Oberm.

Status: VU D2

Found in Zimbabwe, Zambia and Namibia (from Mpililo Island in Coprivi). This species is restricted to the Zambezi River drainage area and is uncommon in Botswana. The species has a narrow distribution range and straddles the borders of the four countries in which it occurs. The species was collected in Botswana (Mpondomotengo), but recent surveys have not been able to relocate it there. The species grows at the base of Acacia; found in gravelly soil.

### *Orbea tapscottii* (I.Verd.) L.C.Leach

Status: EN A1ac

Threats: Grazing, desiccation, urban expansion

Also known from South Africa. In Botswana, collected in Pitsone Pan, but a recent survey failed to find it there again; the area has been heavily overgrazed. Other known localities of this species (near Gaborone and Malepalale) have been decimated due to the impacts of donkeys and goats, as well as expanding urban centres. Often associated with Acacia hebeclada subsp. chobiensis.

### *Orbeopsis knobelii* (E.Phillips) L.C.Leach

Caralluma kalaharica Nel

Status: VU D1D2

Threats: Harvesting

First described in Malepalale. This species is uncommon and difficult to locate in the wild. The subpopulations are very small and disjunct in Botswana. Found on Kalahari sands. Also known from South Africa, Namibia, and elsewhere. Although widespread, it is always rare. It is eaten by people and animals. Has whitish to greenish flowers with purple patches. The whole plant is eaten raw or roasted. Locally it is called 'dadaba'. It has a smoky flavour and is a good source of water.

## EUPHORBIACEAE

### *Euphorbia venterii* L.C.Leach ex R.Archer & S.Carter

Status: EN C2a

Endemism: Endemic?

Threats: Urban expansion

Only two subpopulations recorded in Botswana from a gypsum substrate. These subpopulations are extremely disjunct (one in the north, the other in the south) and occur close to the border of eastern Botswana. The possibility exists that this species occurs in Zimbabwe (Plumtree) but this cannot be established without field work and taxonomic validation.

## LYTHRACEAE

### *Nesaea minima* Immelman

Status: VU D2

Endemism: Endemic

Known only from the moist grassy area of the Zwezwe Flats floodplain in Botswana.

## ORCHIDACEAE

### *Ansellia africana* Lindl.

Status: VU A1ad

Threats: Collection

This is the only epiphytic orchid in Botswana. All orchids are rare in Botswana and therefore, are usually collector's items amongst ecotourists. Frequently observed in cultivation. Wide distribution throughout Africa, but certainly threatened in Botswana. Rumoured to have ophrodissiac properties.

### *Eulophia angolensis* (Rchb.f.) Summerh.

Status: VU A1ad

Threats: Collection

Large, showy orchid that grows in peaty ground in perennial and seasonal swamp. In possible danger due to collectors. Flowers from late October to December. Widespread in Angola, Zambia, Tanzania, Uganda and so forth.

### *Eulophia latilabris* Summerh.

Status: VU A1ad

Threats: Collection

Large, showy orchid that grows in peaty ground in perennial and seasonal swamps. In danger due to collectors. Flowers from late October to December. Widespread in West Tropical Africa.

## PORTULACACEAE

### *Anacampseros rhodesiaca* N.E.Br.

Status: VU A1ad

Threats: Harvesting

Uncommon in Botswana as this species is at the end of its western distribution range. It is found close to the border near Francistown, and then extends easterly into Zimbabwe. Has a cryptic, rare habitat in Botswana; known from accessible crevices in bare rocky outcrops. It has also been collected in Tontobone (Toti). It has short branches covered with tiny scale-like leaves arising from the tuber. The genus *Anacampseros* has been split into three genera, and the genus *Avonia* is the relevant name for this taxon. However, this name is not in use in Botswana. In Zimbabwe, it is known as 'quiliiko' or 'tinko'. Prohibitions were introduced to prevent the use of this species for beer-making.

## SAPINDACEAE

### *Erythrophysa transvaalensis* I.Verd.

Status: VU D1D2

The first and only record for Botswana was collected in Shashong in 1993. Known from the former western Transvaal (South Africa) where it is considered rare. Also known from Zimbabwe (possibly Motopos). The habitat of this species is rocky wooded hills, of which there are few in Botswana.



***Hoodia* sp. from the Kalahari sands of southern Botswana.  
(Photo: NBI)**



# LOWER RISK

## ACANTHACEAE

*Barleria matopensis* S.Moore

Status: LR-lc

No herbarium record of it being collected in Botswana, and also not in PRECIS. However, observed in the wild in Botswana. The distribution of this species in Botswana represents a small proportion of the global population. Known mainly from an area between Francistown and Romokgwebona. Probably first collected in Matopos in Zimbabwe. Also known from the former Transvaal (South Africa).

*Blepharis bainesii* S.Moore ex C.B.Clarke

Status: LR-lc

Known from gypsum substrate in southeastern Botswana. Reported to have been observed several times in the vicinity of Matloutsi(e). Also known from southwestern Zimbabwe. However, not found in the former Transvaal area of South Africa. Possibly no herbarium specimens for Botswana. Limited global distribution.

## CAPPARACEAE

*Boscia foetida* Schinz subsp. *minima* Toelken

Status: LR-nt

Threats: Grazing

The variety status of this species represents plants shorter than 30 cm that are cushion-like. It is suspected that this dwarf form could be a growth form as a result of overgrazing. It may be rare, but it is certainly not threatened in Botswana. It is a shrub found on limestone outcrops, often near pans or on clay soils. Also found in South Africa (Northern Cape and former Transvaal). Apparently not recorded in Namibia.

## CYPERACEAE

*Pycnus okavangensis* Podlech

Status: LR-lc

Nondescript, small plant. Widespread in northwest Botswana occurring throughout the lower delta, on the Chobe River and near a pan in the Kolahori. Also recorded in Namibia and possibly Angola and Zambia. The species has a wide distribution range.

## EUPHORBIACEAE

*Jatropha botswanaica* Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

According to PRECIS, known only from Botswana. This species is fairly well protected since it occurs on black clay which is unusable and generally avoided by developments or human settlements. Currently known only from two localities, and this is probably due to collecting efforts.

## FABACEAE

*Acacia hebeclada* DC subsp. *chobiensis* (O.B.Mill.) A.Schreib.

Status: LR-nt

Multi-stemmed tree-shrub. Found in riverbanks or sandbanks close to the northern border of Botswana but only for a limited distance downstream. The species is rare where it occurs, but its numbers and the size of its habitats are exceedingly small when compared to other plants from Botswana. It occupies a niche on an unstable landform (riverbanks/sandbanks). It is very sensitive to unnatural water level fluctuations. Found in Angola, Namibia and Zambia.

## PEDALIACEAE

*Harpagophytum procumbens* (Burch.) DC. ex Meisn.

Status: LR-nt

No subspecies or varieties of this species is in use in Botswana. High-value export product for its medicinal properties. More valued than *H. zeyheri* since the active ingredient is more concentrated. Could become threatened due to reckless harvesting which is already reported to be taking place (the main tuber is removed rather than the side tubers). However, high levels of recruitment. Found mainly on the Kolahori sands of western Botswana.

*Harpagophytum zeyheri* Decne.

Status: LR-nt

No subspecies or varieties of this species is in use in Botswana. High-value export product for its medicinal properties. For more accessible than *H. procumbens* since it is fairly common along the roadsides of eastern Botswana. High levels of recruitment.



*Acacia hebeclada* subsp. *chobiensis* in habitat in the Okavango Delta. (Photo: M.P. Setshogo)

# DATA DEFICIENT

## AIZOACEAE

*Nananthus aloides* (Haw.) Schwantes

Status: DD

Endemism: Endemic?

Known from border area of the Nassab River. The herbarium descriptions of the distribution of this species are unclear, and therefore it cannot be confirmed if the species also occurs in Namibia and South Africa.

*Nananthus margaritifolus* L.Bolus

Status: DD

Na herbarium records exist for this species in Botswana. Also known from Namibia where it is legally protected.

## ASCLEPIADACEAE

*Ceropegia floribunda* N.E.Br.

Status: DD

Endemism: Endemic?

According to PRECIS, endemic to Botswana. The type locality is Khwebe Hills. Suspected to also occur in Namibia but this has not been confirmed. May possibly occur in South Africa, but again, this cannot be confirmed. Taxonomically, this species is poorly known.

## ASTERACEAE

*Arctotis rogersii* S.Moore

Status: DD

Could be endemic to Botswana, but may be a synonym or may occur further north. Reported that this may be a garden hybrid which occurs in the Cape (South Africa) but this cannot be confirmed. The taxonomic status of this species is uncertain.

*Arctotis serpens* S.Moore

Status: DD

Could be endemic to Botswana, but may be a synonym or may occur further north. Reported that this may be a garden hybrid which occurs in the Cape (South Africa) but this cannot be confirmed. The taxonomic status of this species is uncertain.

*Erlangea remifolia* Wild & G.V.Pope

Status: DD

Endemism: Endemic?

According to PRECIS, endemic to Botswana. Based on the number of herbarium collections, is reported to be common. However, this could well be an artefact since the collections could perhaps have been mistakenly identified as *E. misera*, a common species in Botswana.

*Rennera laxa* (Bremek. & Oberm.) Kallersjö

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.

## CYPERACEAE

*Eleocharis cubangensis* H.E.Hess

Status: DD

Endemic to the Okavonga River, and currently known only from Namibia and Botswana.

## ERIOSPERMACEAE

*Eriospermum linearifolium* Baker

Status: DD

Endemism: Endemic

Could be endemic to Botswana, but may be a synonym or may occur further north. Recorded from the Okavonga

and Chabe area. Not known from Namibia.

*Eriospermum seineri* Engl. & K.Krause

Status: DD

Endemism: Endemic

Nat recorded in Namibia. Suspected to be endemic to Botswana, but may be a synonym or may occur further north.

## FABACEAE

*Acacia hebeclada* DC. subsp. *tristis* A.Schreib.

Status: DD

Has dawn-turned pods, and a small proportion of the global population is distributed in Botswana. It is found in the northwestern corner of Botswana. Mostly, it is known from Namibia and a few plants extend into Botswana in the fossil river valleys. This area is extremely well-protected and inaccessible. This area has also been relatively unexplored by botanists.

## ORCHIDACEAE

*Habenaria pasmithii* G.Will.

Status: DD

In Botswana, it is known only from the Okavonga (type locality). Known from a second collection in Mwinilunga (Zambia). Apparently known only from these disjunct localities. Probably a case of being undercollected or misidentifications of other taxa found between these two localities (possibility of a uniform distribution?). In water meadows and slow-flowing water.

*Zeuxine africana* Rchb.f.

Status: DD

Extremely rare in southern Africa, but widespread across Africa. In Botswana, known only from the Maremi Nature Reserve, as well as other localities in the north of Botswana such as Xabega Lediba. Flowers in July to August.

## POACEAE

*Aristida wildii* Melderis

Status: DD

Endemism: Endemic?

Could be endemic to Botswana, but may be a synonym or may occur further north (unlikely to occur in the Caprivi). Found in areas of Botswana that are generally rocky.

*Panicum coloratum* L.Mant. var. *makarikariense* Gooss.

*Panicum laevifolium* Hack. var. *contractum* Pilg.

*Panicum coloratum* L.Mant. var. *coloratum*

Status: DD

Endemism: Endemic

The variety is regarded by some as being taxonomically

invalid. Localities of this plant beyond Botswana are instances where the species was introduced. In Botswana, it is known from the north (Makarikari Pan) and the southeast (Gaborone). It is used as a pasture grass.

*Panicum gilvum* Launert

Status: DD

Also known from Namibia and South Africa. In Botswana, it is known from the north in seasonal water pans. Probably undercollected and widespread.

*Panicum pilgerianum* (Schweick.) Clayton

*Psilachlao pilgeriana* (Schweick.) Launert

Status: DD

In Botswana, it is known from the north (Somedupe Bridge) and the southeast (Content Farm). It is also found in Namibia, in seasonally flooded areas, growing in water. Altitude of about 1,050 m. Probably undercollected and widespread.

*Sporobolus bechuanicus* Gooss.

Status: DD

Endemism: Endemic

According to PRECIS, known from fewer than five collections and occurring only in Botswana. However, reported to be very common in pans of Makgadigadi and Lepepe. The main centre of distribution is central Botswana.

## ROSACEAE

*Grietum cuneifolium* Schinz

Status: DD

The type is from Lydenburg in South Africa. The species does not occur in Namibia. It has a restricted global distribution.

## SANTALACEAE

*Thesium dissitum* N.E.Br.

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.

## SCROPHULARIACEAE

*Jamesbrittenia integerrima* (Benth.) Hilliard

*Sutera batipina* Hiern

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.

*Jamesbrittenia concinna* (Hiern.) Hilliard

*Sutera concinna* Hiern

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.



Sunset in an aquatic landscape at Chobe.  
(Photo: NBI)



# Lesotho



Sumitra Talukdar\*

## Introduction

The Kingdom of Lesotho—a British Territory from 1868 and a Crown Colony from 1884 to 1966—is today a 30,300 km<sup>2</sup> independent state completely surrounded by the Republic of South Africa. Bordering Lesotho are the South African provinces of the Free State in the north and west, the Eastern Cape in the south, and KwaZulu-Natal in the east. The western quarter of Lesotho is a continuation of the South African highveld at 1,400 to 1,800 m a.s.l.; within Lesotho this area is known as the *Lowlands* or *Mabalane*. To the east of the Lowlands, the land between 1,800 m and the crest of the first range of mountains is known as the *Foothills*. East of the Foothills, the remainder of the country is known as the *Maloti*, and consists of a number of mountain ranges running mainly north to south, with deeply incised valleys. In the far east of Lesotho the Maloti culminates

in a summit plateau, the eastern rim of which is the watershed between the Atlantic and Indian Oceans and is also the international boundary. Very little of the summit plateau falls within South Africa, because almost immediately to the east of the watershed, the Drakensberg escarpment occurs, typically cliffs about 1,000 m in height dropping down to a foothills region in KwaZulu-Natal.

## Geology

Geologically, Lesotho consists of a series of layers of sedimentary rocks overlaid at about 1,800 m a.s.l. by basalt layers, originating from lava that welled up through dolerite dykes which criss-cross the sedimentary as well as the lower igneous layers. The basalt reaches a thickness of some 1,500 m, but the original land surface has been dissected by river valleys. These have been rejuvenated as a result of a series of

**Capital:** Maseru, largest city

**Area:** 30,355 km<sup>2</sup>

**Languages:** English, Sesotho (both official)

**Currency:** Maloti (M), on a par with South African Rand

**Total plant species:** 1,591

**Total plant endemics:** 17

**Total RDL plants:** 94

**Focal RDL institutions:** ROML, PRE

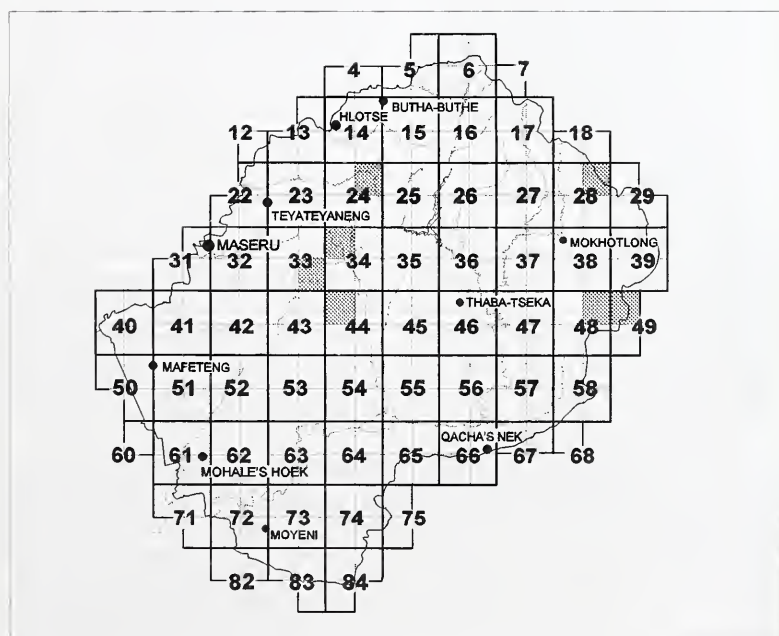
**Number of Protected Areas:** one National Park, one Transfrontier Park (Lesotho–South Africa) and several different types of informally protected areas.

**Population:** 2,105,000 **Growth Rate:** 2.3% **Density:** 66.3 people/km<sup>2</sup>

**Phytogeography:** Mainly high elevation Afromontane grasslands with Moist Cold Highveld Grasslands in the lower-lying areas of the west.

**Flora:** Predominantly montane grassland with occasional patches of woodland in ravines and river valleys.

**Sources:** Anonymous 2000, Low & Rebelo 1998, Mokuku 1999, Talukdar 1994



Map of Lesotho, showing quarter-degree grid squares.

\*National University of Lesotho, Roma, Lesotho



*Aloe polyphylla*, a well known high-altitude species. (Photo: J.S. Golding)

uplifts that have left largely horizontal strata in place.

## Climate

The climate is generally sunny with an average of 8.8 hours of sunshine a day throughout the year. The seasons are well defined with dry winters and frosts, and temperatures in the Lowlands range from night minima as low as  $-6^{\circ}\text{C}$  in winter and day maxima up to  $35^{\circ}\text{C}$  in summer. There is a diurnal range of about  $18^{\circ}\text{C}$  in winter and  $15^{\circ}\text{C}$  in summer. Given that the temperature drops about  $1^{\circ}\text{C}$  per 125 m rise in altitude, the summit plateau can experience temperatures down to  $-20^{\circ}\text{C}$  on winter nights, while summer maxima will remain in the range  $20\text{--}25^{\circ}\text{C}$ .

Rainfall ranges from 600 mm p.a. in the western Lowlands to 1,200 mm in the northern and eastern parts of the summit plateau. In general, there is a marked increase in rainfall as one passes eastwards, except that the Senqu Valley in the central eastern part of Lesotho is in a rain shadow from mountains on both sides and is, in fact, the driest part of Lesotho, with rainfall in places as low as 550 mm p.a. Most rainfall occurs in summer (85% in October to April) as the result of convective storms of relatively short duration, but often associated with downpours and much runoff. More gentle rain from the north-east may last for a few days but occurs only two or three times in a typical summer.

## Vegetation Types

There are three main vegetation zones within the overall Grassland Biome which embraces the whole of Lesotho (Ambrose

*et al.* 2000):

- The *Highveld Grassland Zone* roughly corresponds to the Lowlands
- The *Afroalpine Grassland Zone* corresponds to the summit plateau above 2,500 m altitude, the highest areas within which (rising to a maximum of 3,482 m at Thabana-Ntlenyana) is the only true tundra in southern Africa (Killick 1997)
- Between these zones, the *Afromontane Grassland Zone* corresponds to the remainder of the Maloti and the Foothills.

Though grasses are the most striking features in the vegetation, there are a number of woody plants, trees, and shrubs, and a wealth of herbaceous plants. Within all three zones, are found *Wetlands*, both marshy areas and rivers, which have their own characteristic aquatic flora.

It is the Foothills and Maloti in Lesotho that have plant species uniquely adapted to high altitudes and extreme environmental stresses. The area forms part of the Eastern Mountain or Maloti/Drakensberg “hotspot” (after Myers 1988, Cowling & Hilton-Taylor 1994) with a high degree of endemism (30%). More than half of this hotspot falls within the boundaries of Lesotho, and a large number of plants that are restricted to the hotspot are commonly known as “Drakensberg endemics,” although they might be more correctly known as “Maloti/Drakensberg endemics” given that the name Drakensberg is only applied to the eastern escarpment within the hotspot area.

Unfortunately, extreme human pressures on the environment in Lesotho through cultivation, grazing, and construction works have become a serious threat to the

specialised indigenous flora. It is therefore important to undertake periodic assessments of the flora to document the changes in its number and composition.

Bryophytes, which have not been evaluated for the *Southern African Plant Red Data Lists*, have sprung many surprises as recorded by Lewinsky & Van Rooy (1990), Hodgetts *et al.* (1999), and Perold (1994, 1998, 1999). Earlier, Magill (1987), who wrote the *Drakensberg of Lesotho* (he meant of course “the Maloti”), said that “it stands out as a biogeographical treasure”.

## Lesotho Plant Recording

There are a few rare examples of plants recorded in rock paintings, which may be several hundred years old. For example, Loubser & Zietsman (1994) described a depiction of what is probably *Brunsvigia radulosa* at Thaba-Bosiu in Lesotho.

The first written record seems to have been by Sir Andrew Smith when he described an *Albucca* with yellow flowers and woolly stalks and leaves at Likhoale (“Dequoila”) on 10 October 1834 (Smith 1939). It appears to have been *Albucca shawii* (= *A. tri-chophylla*).

A meticulous collector who also recorded Sesotho names and local plant uses was Anna Dieterlen, wife of Hermann Dieterlen, an Alsatian missionary. While the Dieterlens were stationed at the French Protestant Mission of Leribe (1894–1913), Anna Dieterlen made an almost exhaustive collection of the local flora. Her material provided the essential core of *A contribution to the flora of the Leribe Plateau and environs* (Phillips 1917), the first comprehensive account of the flora of Lesotho. The book lists 329 genera and 749 species; 48 of these species are aliens. Lesotho had previously been regarded phytogeographically as being in a “Kalahari Region,” but Phillips proposed an Eastern Mountain Region to include Lesotho and its immediate surroundings. For this region, he enumerated 91 orders, 466 genera and 1,553 species.

Moreover, Phillips (1917) remarked about the Levi’s Nek Kloof near Leribe, that *Protea caffra* “is rapidly becoming exterminated, as the chief Jonathan now and then has trees cut down for firewood; but fortunately this is a privilege Jonathan alone enjoys, otherwise the species would long ago have disappeared from the neighbourhood”. Given the loss of tree species elsewhere in Lesotho, it might be expected that there



would be little chance that *Protea* would be found in the area today, but Grzegorz Kopij (pers. comm.) reports that it can still be found in the same kloof, albeit in a restricted area.

Both Phillips (1917) and Jacot Guillarmod (1971) give accounts of many people who collected in Lesotho. The *Flora of Lesotho* (Jacot Guillarmod 1971) provides a more recent comprehensive checklist of Lesotho plants and lists 526 genera and 1,537 species of flowering plants. She provides much useful background information and identifies just two Lesotho endemics—the well-known spiral aloe, *Aloe polyphylla*, and the grass *Pentaschistis basutorum*, although in the second case there are now Free State records. She mentions the fern ally *Psilotum nudum* as having a very restricted distribution in Lesotho, and indeed at the present time it is known from only one site (Ambrose *et al.* 2000). Amy Jacot Guillarmod also co-authored the description of the new species *Aponogeton ranunculiflorus* (Jacot Guillarmod & Marais 1972, Jacot Guillarmod 1978), a plant that was first collected by Kate Williamson at Sehlabathebe in Lesotho in 1970; there are now some KwaZulu-Natal records. The plant is now known as the Sehlabathebe water lily and appears on the current Lesotho 15s postage stamp.

Another Lesotho plant collector was Marthe Ruch (later Marthe Schmitz), who came to Roma in 1958 to work in the Botany Department of Pius XII College. She lived in Lesotho until 1982, when she was tragically killed in a car accident. For much of the 24 years that she was in Roma, she was Honorary Curator of the Roma Herbarium, ROML, now housed within the Biology Department of the National University of Lesotho. She collected extensively in Lesotho, being particularly interested in the ecological aspects of plant distribution. Amongst her publications are *Flowering plants of Lesotho: grasses* (1976), which deals mainly with grasses of the Lowlands and Foothills, but includes five high-altitude species. *Wild flowers of Lesotho* was pub-

lished posthumously in 1982, as was *An illustrated key for the identification of the grasses of Lesotho* (1984). This was a more comprehensive account of Lesotho grasses than her 1976 volume, with 17 high-altitude grasses of which three may be considered today as near endemics.

Bruce Hargreaves, Marthe Schmitz's successor as Curator of ROML, joined the National University of Lesotho in 1983 and had a special interest in succulent flora. He discovered the endemic *Crassula goatlham-bensis* (Hargreaves 1989b) at Tlaeeng Pass at an altitude of over 3,000 m on the eastern summit plateau and later found additional populations at Kotisephola Pass and near Sani Pass. The type specimen is in ROML. He travelled extensively throughout Lesotho and located a number of rare plant species in the Maloti and the Lowlands.

The names of D.J.B. Killick and of O.M. Hilliard and B.L. Burtt are closely linked with the study of high-altitude vascular plants, including those of Lesotho. Killick's account of the plant ecology of the Cathedral Peak area of the Natal Drakensberg (1963) extended to the Afroalpine Grassland of the Tlhanyaku headwaters in Lesotho. His interest in the high-altitude flora led to many visits to the Maloti in Lesotho, and he made collections at Ox-bow, Letseng-la-Terae, Mokhotlong, and Sani Top. His *Field guide to the Flora of the Natal Drakensberg* (1990) is an attractively illustrated account, which includes many species common to both sides of the border, although the gymnosperm species found in KwaZulu-Natal are not found in Lesotho. Dr Killick was particularly punctilious in providing the Roma Herbarium (ROML) with duplicate specimens.

O.M. Hilliard and B.L. Burtt have visited the Maloti several times and their meticulous studies have led to the discovery of several Lesotho endemics, such as *Sutera jurassica* (Hilliard & Burtt 1982) (= *Jamesbrittenia jurassica* (Hilliard 1994)), *S. beverlyana* (Hilliard & Burtt 1986a) (= *J.*

**Table 2. Lesotho endemics.**

Endemism	Number of taxa
Confirmed endemic	13
Suspected endemic	4
Confirmed near-endemic	30
Suspected near-endemic	7
<b>TOTAL</b>	<b>54</b>

*beverlyana* (Hilliard 1994)), *Hesperantha crocopsis* (Hilliard & Burtt 1986c), and *J. lesutica* (Hilliard 1994). ROML has also benefited from receiving many duplicate specimens from Olive Hilliard and B.L. Burtt, who have checked the identity of several ROML specimens.

Amongst others who have provided specimens to ROML are E.K. Hoener and Alan C. Beverly, both of whom were based at Sehlabathebe National Park for extended periods at different times in the mid- to late 1970s. Although no specimens reached ROML from the Lesotho Highlands Water Project Phase 1A baseline surveys, duplicates from similar surveys in the Phase 1B area have been placed in ROML. Other sets of accessions to ROML have been received as a result of an expedition to the Maloti undertaken by botanists sponsored by the Lesotho–Durham Link and from a similar expedition sponsored by the Royal Botanic Garden, Edinburgh.

## Red Data Lists

Towards the second half of the 20th century, it was becoming apparent that population growth was putting additional pressure on land resources worldwide and that this threatened the very survival of many animal and plant taxa. A Threatened Plants Committee was established in 1974 by the World Conservation Union (IUCN). As a result of this initiative, lists of threatened taxa, known as “Red Data Lists,” were compiled both worldwide and for many geographical areas. The worldwide IUCN volume (Lucas & Syngé 1978) includes the Lesotho endemic *Aloe polyphylla* amongst 250 selected plant species. In southern Africa, the Foundation for Research Development of the South African Council for Scientific and Industrial Research (CSIR) produced Red Data Books for plants and animals, some of which were confined to taxa within South Africa's borders, although the plant volume by Hall *et al.* (1980) provided southern African and not just South African coverage.

**Table 1. Number of taxa in each Red List category in Lesotho.**

RDL Status	Number of taxa
Extinct (EX)	1
Critically Endangered (CR)	8
Endangered (EN)	4
Vulnerable (VU)	14
Lower-Risk near threatened (LR-nt)	4
Lower-Risk least concern (LR-lc)	3
Data Deficient (DD)	60

A conference on the conservation and utilisation of southern African botanical diversity was convened in Cape Town in September 1993, and the papers and workshop reports were later published (Huntley 1994). The conference recognised the need to produce updated Red Data Books for planning effective conservation policies. Consequently the *Red Data List of southern African plants* (Hilton-Taylor 1996a) was published, it featured the spiral aloe, *Aloe polyphylla*, on its cover.

## Methods

The IUCN system for Red Data List categories and criteria was used (IUCN 1994) in the compilation of the RDL for Lesotho.

The term “endemic” is used for plants that occur in Lesotho only and in no other country. The degree of threat has been assessed in the Lesotho context (national). In other areas of southern Africa, the threats to these same species may not be of the same intensity. The publications of Arnold & De Wet (1993), Hilton-Taylor (1996a), and Scott-Shaw (1999) have been useful in placing the locally vulnerable plants in a wider, global context.

## Results and Discussion

The Red Data List for Lesotho contains a total of 94 species (Table 1) of which 56 are known to have narrow global distribu-



***Boophane disticha*, abundant in Lesotho and South Africa, is heavily utilised for medicinal purposes in the Lesotho lowlands. (Photo: J.S. Golding)**

tions (endemics and near-endemics) (Table 2). One endemic, *Bractystelma alpinum*, is strongly suspected of being extinct. *Agathosma ovata*, classified as *Vulnerable*, is thought to be extinct in Lesotho, although it is well-known in South Africa where its main distribution range is in the Western Cape Province. There are conflicting reports of the abundance of this species in Lesotho. Similarly, *Smodingium argutum* is classified as *Data Deficient*, as it is believed to be extinct in Lesotho, although this could not be confirmed.

Species which may soon become *Critically Endangered* in Lesotho because they are facing a dramatic reduction in population size in the country are *Anisodonteia gracilis*, *Cyathea dregei*, *Ehretia rigida*, *Lotononis listii*, *L. stricta*, *Protea roupelliae*, *P. subvestita*, and *Sparrmannia ricinocarpa*.

Four species that are regarded as being endemic to Lesotho have been categorised as *Vulnerable*, and all are from the Maloti: *Aloe polyphylla*, *Carex killickii*, *Jamesbrittenia beverlyana*, and *J. lesutica*. Three high-altitude near-endemics (also occurring in South Africa) have a restricted global distribution—*Urginea saniensis* is categorised as *Vulnerable*, whereas *Festuca killickii* and *F. dracomontana* were assessed as *Data Deficient*.

Several species—all with restricted distribution ranges—are used in traditional medicine; this has resulted in their becoming vulnerable in Lesotho. The scale of disappearance of medicinal plants in Lesotho has been estimated by Letsie (1993) to be in the order of 100,000 specimens per week, based on an estimated 20,000 diggers taking out five plants each. The species are *Alepidea anatyubica*, *Dicoma anomala* subsp. *cirsioides*, *Eucomis autumnalis* subsp. *clavata* (all VU), and *Elephantorrhiza elephantina* and *Scilla natalensis* (both DD). Because the underground parts of the plants are used medicinally, utilisation results in their destruction. The remaining vulnerable taxa found in Lesotho are remnant or limited area populations that are in most cases common elsewhere in southern Africa.

Eight species classified as *Data Deficient* are believed to be Lesotho endemics. In addition, 25 taxa categorised as *Data Deficient* are regarded as near-endemics.

*Glumicalyx lesuticus* and *Jamesbrittenia jurassica* are both endemics that are fairly widespread and abundant in Lesotho; for

this reason they are categorised as *Lower-risk least concern*.

## Conclusions

Throughout this analysis, it has been apparent that the threats to plants are due mainly to human pressure as a result of the extension of settlements and, especially, the pressure by livestock on the fragile ecosystems of the Afroalpine and Afromontane Grassland. The vegetation zones are found in the Maloti on and near the summit plateau adjoining Lesotho's eastern border. Indeed, most endemic and threatened species are to be found within a few kilometres of this eastern border. In the Lowlands and Foothills, areas of much modified Highveld Grassland, severe population pressure has led to such overutilisation of plants for medicinal and domestic purposes that previously viable populations maintain only a precarious existence.

In order to preserve threatened plant populations, a system of locally managed reserves is required. It is essential that in any such developments, those who live among and utilise the plants play a part in their sustainable use and survival.

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# EXTINCT & THREATENED

## ALOACEAE

### *Aloe broomii* Schonland

Status: VU B1B2cb

Threats: Harvesting, collection, habitat degradation  
This widely distributed *aloe* has a single paker-like inflorescence up to a metre long and a close rosette of spine-tipped leaves. The main centre of distribution for this species is in the Free State, Kora, Eastern Cape and Northern Cape (South Africa). The species extends into western Lesotho which contains about 10% of the global distribution of this species. Its distribution extends into western Lesotho, and also patchily (although a proper survey is needed) up the Senqu Valley to beyond Linokeng. The species is restricted to riverbanks in Lesotho. Between 100 and 200 individuals estimated from Mahale's Haek where its habitat is currently undisturbed. The species is utilised and there are cases where several sites in Lesotho have become extirpated due to habitat degradation. There are two forms—one with small bracts and conspicuous flowers, the other with large bracts that completely obscure the flower. Although varieties of this species are known to exist, only the species name is in use in Lesotho. The name *A. broomii* var. *broomii* is sometimes applied to the taxon in Lesotho.

### *Aloe polyphylla* Schonland ex Pillans

Status: VU B1B2cbce

Endemism: Endemic?

Threats: Road network, collection

The most recent reports state that despite a limited survey, at least 17,000 plants are known to exist in the wild. During a comprehensive survey undertaken in 1999, many previously unrecorded sites were discovered. Although the species is known to be removed from lower-lying, more accessible areas for horticultural purposes, many individuals remain in the wild. The population is characterised by high levels of recruitment. Despite the species being harvested intensively for at least the last 50 years, the population seems to be stable. The species was assessed as Endangered by both Hilton-Taylor (1996a) and Scott-Shaw (1999). There is an unconfirmed locality in KwaZulu-Natal (South Africa). Scott-Shaw (1999) mentions an 'unconfirmed outlying population in the KZN Drakensberg', but without further evidence there is no reason to change the Lesotho endemic status of *A. polyphylla*. It is suspected that an additional locality in the Free State (South Africa) is now extinct, but only field surveys can confirm this.

### *Aloe pratensis* Baker

Status: VU B1B2cbde

Threats: Harvesting

This small *aloe*, relatively common in South Africa, occurs in Lesotho only in a limited area of Qacha's Nek District (Jacot Guillarmod 1971; RÖML records from Hargreaves). Listed as Uncertain in Hilton-Taylor. Also found in the Eastern Cape and KwaZulu-Natal (South Africa). The distribution stretches from sea level in Grahamstown to Cathedral Peak and Champagne Castle on the eastern side of the Drakensberg (South Africa). It is distributed in a band in southern Lesotho.

## AMARYLLIDACEAE

### *Boophane disticha* (L.f.) Herb.

Status: EN A2d

Threats: Collection, harvesting

This plant has a massive bulb, the dry outer scales of which are used to dress wounds and boils and appear to have antiseptic properties. It is now being brought in from South Africa since there is a big demand. It was used as a source of arrow poison by the San or Baraa who once lived in Lesotho before they were replaced by

pastoralists. Its endangered status applies only to Lesotho as it is widely distributed in southern Africa.

## APIACEAE

### *Alepidea amatymbica* Eckl. & Zeyh.

Status: VU A1A2d2d

Threats: Collection, urban expansion

A popular medicinal plant used for treating coughs and colds, fevers and rheumatism, this plant is actively collected for its roots. Formerly widespread in Lesotho, it is regarded as vulnerable in Lesotho, because it is not used sustainably. Whole localities have gone extinct. Found from near Maseru near human settlements and at Tes'itanyane in Leribe. It used to be found at the foot of the hill near Mlarakabei; now it is mostly restricted to the mountains. It is heavily utilised in the KwaZulu-Natal Midlands (South Africa). Widespread in summer rainfall areas of southern Africa. It is locally abundant where it is not exploited. It is used for cough remedies and colds. The plant is a reseeder. Scott-Shaw assesses it as LR-nt.

## APONOGETONACEAE

### *Apogoneton ranunculiflorus* Jacot Guill. & Marais

Status: CR B1B2d

Endemism: Near-endemic

Threats: Grazing, desiccation

First located in Sehlabathebe 'confined to pools up to 7 m deep in Cave Sandstone [Clarens] formation at about 2,600 m altitude' (Jacot Guillarmod & Marais 1972). Jacot Guillarmod (1978) published more finds by P. Coakingham who explored the South African side of the border fence within about 2 km of the nearest site in the Park and found some in pools in the sandstone at the same altitude. Schmitz (1982) reported another population discovered by Jahn Jilbert, which is well inside Lesotho in clear pools in the basalt of the Thaba-Putaa Range 2,900 m (Sheet 23D) from Jahn Jilbert.

## ASCLEPIADACEAE

### *Brachystelma alpinum* R.A. Dyer

Status: EX?

Endemism: Endemic

Type specimen came from near Ramatselisa's Gate, Qacha's Nek District. (Holotype Boyliss 819, PRE) (Dyer 1980). It has not been found in the same area despite several searches by Hargreaves (1999). The possibility of finding it in a different area of Lesotho is not totally ruled out. Despite Scott-Shaw assessing it as VU D2, the assessment acknowledges that it is known from only the type locality and states that a future need is to find subpopulations of this species.

## ASTERACEAE

### *Dicoma anomala* Sand.

Status: VU A2d

Threats: Collection, habitat degradation

The root of 'hlaeny' is used medicinally. On its own, or mixed with other herbs, it is used for a very broad range of ailments: aches and pains, diarrhoea and colic, rheumatism and fevers. It is also given to diabetics (Maliehe 1997). It is found in the Lawlands and Faathills.

## CRASSULACEAE

### *Crassula goathambensis* Hargr.

Status: EN A2CB1B2c

Endemism: Endemic

Threats: Urban expansion

This *Crassula* is an endemic of the summit plateau. The holotype, Hargreaves 4955, is from Tloeng Pass, Mokhatlang District at 3,270 m. Two subpopulations were seen in Sani Pass area 2,800 m (Hargreaves 1989b). There remains a distinct possibility that the species may be eaten by cattle at this locality.

## CYATHEACEAE

### *Cyathea dregei* Kunze

*Alsophila dregei* (Kunze) R.M. Tryon

Status: CR D

Threats: Habitat degradation

One old tree fern was recorded from Sehlabathebe. There is no confirmation that it is still surviving in the Park. Possibly extinct.

## CYPERACEAE

### *Carex killickii* Nelmes

Status: VU D2

Endemism: Near-endemic

This plant has been only found in a narrow zone on the Lesotho side of the eastern watershed (RSA sheet 2928AA, Lesotho sheet 28B). There is also a mention of this sedge in a checklist (Scott-Shaw 1998) for Tshelanyane (Lesotho sheet 15D, RSA sheet 2828CD), 130 km west of the escarpment. The species is known from Indameni Dam and Castle Buttress (South Africa). Although it has a narrow distribution range, it does not appear in Hilton-Taylor or in Scott-Shaw. This species has been undercollected.

## HYACINTHACEAE

### *Eucomis autumnalis* (Mill.) Chitt. subsp. *clavata*

(Baker) Reyneke

Status: VU A1acdA2cd

Threats: Collection, habitat degradation, fire  
An extract from the bulb of this plant is given to women to relieve pain during childbirth. Great caution must be used because the plant is poisonous. Leaves are also used for dressing wounds, boils and sores, the juice being first expressed from stems onto wounds or rashes (Rubright 1995). Distribution throughout Maloti. Now it is mostly confined to the lower mountain sides, mainly on the east-facing slopes. Listed as Rare in Hilton-Taylor. Also found in KwaZulu-Natal (South Africa) and further afield in Swaziland.

### *Urginea saniensis* Hilliard & B.L. Burt

Status: VU D2

Endemism: Near-endemic

This lily from Sani Tap has been regarded as a Lesotho endemic by Hilliard (1990). However, Scott-Shaw (1999) records its distribution as 'KZN and Lesotho Drakensberg at Sani Pass' found in 'Drakensberg Alpine Tundra'. The species is known from basalt rock sheets at 2,900 m. Listed as Uncertain in Hilton-Taylor. Scott-Shaw assessed it as Data Deficient.

## LEGUMINOSAE: PAPILIONOIDEAE

### *Calpurnia robinoides* (DC.) E. Mey.

Status: VU D1D2

Endemism: Near-endemic?

Threats: Urban expansion, fire

This is the accepted name in use in Lesotho. The wood of this small tree is used for house building and for firewood (Jacot Guillarmod 1971). Individual trees have been seen near Kara-Kara and on the Mpetana riverbank in Maseru District and at two localities in the Bera District. It has also been reported from the lower Senquyane, northeast of its confluence with the Senqu

(Eustan-Brawn 1996). Much of its distribution in Lesatha is fragmented, many not less than 500 m apart.

**Lotananis listii Polhill**

**Status: CR B1B2abD**

The genus *Lotananis* has a number of species, widely used by Basotho for the treatment of branchitis (Watt & Breyer-Brondwijk 1962). *Lotananis listii* is known from a small population in the upper Kara-Karo Valley and PRECIS records show four other Lesotho records, three from Maseru District and one from Mafeteng District. *L. stricta* has a similarly limited distribution, apparently due to over-collection.

**Lotananis stricta (Eckl. & Zeyh.) B.-E.van Wyk**

**Status: EN C2aD**

Threats: Collection, erosion, fire  
Recent reports suggest that *L. stricta* has become rare in Lesotho. It is a medicinal plant. Only one plant was seen on the Qoaling plateau in Maseru and a small site at Ho Sekhobe on the western flank of Thaba-Telle in Maseru District has been reported. There is also a record from Blue Mountain Pass area. Older records include Hélène Jacattet at Whitehill, Qacho's Nek District c. 1910; Archibald at Thaba-Tshoeu, Mohole's Hoek District in 1946; and Compton at Likolobeng north of 'Mamalap, Berea District without date (all three cited in Jacat Guillormod (1971)).

**MALVACEAE**

**Anisadantea gracilis Bates**

**Status: CR C2aD**

This plant has been reduced in numbers through intensive land use in its habitat, which is river valleys in the south and west border areas of the Lowlands of Lesatha. Listed as Uncertain in Hilton-Taylor. Also known from Free State and the Eastern Cape (South Africa). Only found once in Lesotho, although only known from South Africa according to PRECIS.

**MYRICACEAE**

**Marella serrata (Lam.) Killick**

*Myrica serrata* Lam.

**Status: VU C2a**

Threats: Collection

A tree whose widely distributed, isolated occurrences in the Lowlands and Foothills suggest an earlier, much larger, distribution. Its roots are used for treating headaches and as an insurance against bad luck. It is also cut for fuel.

**POACEAE**

**Ehrharta longigluma C.E.Hubb.**

**Status: CR C2a**

Threats: Urban expansion

There are apparently just five records of this critically endangered grass: Haener 1747, Sehlabathebe, 1977; Hilliard & Burtt 15521, South KwaZulu-Natal Drakensberg; Marris 182 (ROML 3486), Lejane, 2,300 m, 1991; Smaok 7106 (ROML 3497), 22 km SW of Thoba-Tseka on road to Lesabeng, 2,800 m, 1990; Linder 6698, near Katse [= Mofika-Lisiu] Pass summit 3,200 m, 1998. Since the various collecting points are some distance apart, it is possible that this grass has simply been undercollected and its status may change. Listed in Scatt-Shaw as LR-lc.

**Thamnocalamus tessellatus (Nees) Soderstr. & R.P.Ellis**

**Status: VU D1**

Threats: Collection

This bamboo, indigenous to southern Africa, is widely distributed in Lesatha in remoter areas. Typical subpopulations are made up of 250–300 individuals, which do not flower for many years and then all apparently flower simultaneously after which the plants die. Formerly, the bamboo was used for assegai handles

and for house construction, but newer methods of warfare and house building have reduced exploitation for these purposes.

**PROTEACEAE**

**Protea caffra Meisn. subsp. caffra**

*Protea multibracteata* E.Phillips

**Status: EN B1B2abCde**

Threats: Collection

One large subpopulation and much reduced subpopulations in Mokhuonoone, while some are still left in a residual part (about 2 ha) of Levi's Nek Klaf.

**Protea multibracteata E.Phillips**

**Status: CR C2a**

Threats: Harvesting, grazing

This species was apparently present in Lesatha in the past. ROML has no specimens and the present status is uncertain.

**Protea raupelliae Meisn.**

**Status: CR C2aD**

Threats: Harvesting

*Protea* in Lesotho are in decline. In most cases they seem to be ageing populations, which are not replacing plants that are cut or die. However, the best-known site in Butha-Butha District apparently has several thousand trees of *Protea caffra* Meisn. subsp. *caffra*. In Qacha's Nek District, just one plant of the species *P. subvestita* N.E.Br. survives in the Sehlabathebe National Park, but it was apparently previously more widespread, villages with the name Likolobeng being markers of its former distribution. A report by F.K. Haener (1977) of *P. dracamanatana* at Sehlabathebe is of a plant growing on the South African side of the border. Although all *Protea* species are protected by law, in practice they have little real chance of survival unless the local chief, as indeed is sometimes the case, takes a particular interest in their protection.

**RUTACEAE**

**Agathasma avata (Thunb.) Pillans**

**Status: VU A1cd**

An attractive much-branched shrub with clusters of white flowers, the Oval-leaved Buchu is valued for its traditional medicinal properties. No records have been found after Madame Dieterlen's from Mayeni Mountain

in the south of Lesotho, and one specimen from E.H. Ashton more than 50 years ago. *A. avata* used to be planted in gardens. It could be extinct in Lesotho. Also known from the Eastern Cape and KwaZulu-Natal (South Africa). Listed as Indeterminate in Hilton-Taylor. This species is generally utilised throughout its range.

**SCROPHULARIACEAE**

**Jamesbrittenia beverlyana (Hilliard & B.L.Burtt) Hilliard**

**Status: VU D2**

Endemism: Endemic

This endemic plant appears to be confined to a small area in Sehlabathebe Park in rocky soil under an overhang at about 2,325 m. The locality has been extensively surveyed but without success. Nothing is known about threats at the type locality, and the species quite likely still exists there.

**Jamesbrittenia lesutica Hilliard**

**Status: VU D2**

Endemism: Endemic

Threats: Urban expansion

Recorded specimens of this species have so far all been from Mokhatlang District in Lesatha and (Hilliard 1994) one NBG Compton 21604, 1949, Phutha (Makhatlang), 2,108 m, sheet 38A (holotype); BM [= Natural History Museum, London] Brooke 39, 1938, Phutha, 2,400 m, sheet 38A; m [= Botanische Staatssammlung, Munich], PRE Dohse 313, 1956, Phutha, 2,400 m, sheet 38A; PRE Liebenberg 5691, Meroreng on Sanqebethu, c. 2,500 m, sheet 39A (Lesotho sheet 38 = RSA sheet 2929AC; Lesatha sheet 39 = RSA sheet 2929AD). It has conspicuous white flowers. The species co-occurs with *Jamesbrittenia jurassica* but it has a much smaller distribution range.

**TILIACEAE**

**Sparrmannia ricinocarpa (Eckl. & Zeyh.) Kuntze**

**Status: CR C2abD**

Threats: Grazing, urban expansion

This shrub, although widespread in South Africa and Swaziland, seems to be critically threatened in Lesatha, since it is only known so far from a small group of bushes at Lancers' Gop. Known mainly from the Free State (South Africa).



# LOWER RISK

## ALOACEAE

### *Aloe aristata* Haw.

Status: LR-nt

Threats: Harvesting

A small aloe with attractively spotted leaves. It has been offered for sale along the Mountain Road, probably because those selling it knew that *A. polyphylla* was highly, although illegally, marketable, and now that the supply is exhausted, this might be a marketable substitute. However, it seems that *A. aristata* is itself also becoming rare near the Mountain Road, because it is no longer offered for sale. In the 1950s, *A. aristata* could still be found on the slopes of the hillside at Botsobelo near Moseru (sheet 32D, RSA sheet 29278C) (J. Joques, pers. comm.). Known from the more inaccessible Foothills and Highlands. Found in the Koroo, Eastern Cape and KwoZulu-Notal (South Africa). Protected in the Drokensberg Ukhohlombo Notional Park along Lesotho's border with South Africa.

### *Aloe ferox* Mill.

Status: LR-lc

Threats: Harvesting, urban expansion

This tree aloe, which can exceed 2 m in height, dominates north-facing hillsides in Quthing District, which are obloze with their 500 mm-long vermilion flowering spikes in September and October. It can also be found in Mohole's Hoek District and extends as far as the southern tip of Mofeteng District in the Mokholeng Valley. Indeed, Mokholeng derives its name from this species. Found at Mohole's Hoek, Mafoteng (also Lifoteng) and Tele Tele. Many other localities exist for this species, often adjacent to human settlements. It is claimed that the plant is not threatened, but several localities have become extinct in Lesotho. The species extends into Lesotho. It is found throughout the Eastern Cape, Western Cape, KwoZulu-Notal (South Africa). Lesotho contains about 5% of the global population. The leaves are harvested for medicinal purposes, usually in small quantities. The leaf extract is widely used medicinally, but apparently at present sustainably, so that there seems to be no major threat.

## ASCLEPIADACEAE

### *Brachystelma perditum* R.A.Dyer

Status: LR-nt

Threats: Habitat degradation

There are only two published records for this species: one (found in 1976) in Lesotho 'north of Romo's Gate' (Dyer 1980) and the type specimen (found in 1907) from Nyiginye, north of Ntobomhlope in Drokensberg foothills, 1,800 m, KwoZulu-Notal. Listed as Rare in Hilton-Taylor; also known from KwoZulu-Notal and Free State (South Africa).

## HYPOXIDACEAE

### *Rhodohypoxis thodiana* (Nel) Hilliard & B.L.Burtt

Status: LR-nt

Endemism: Near-endemic

Threats: Habitat degradation, grazing

Recorded (Hilliard 1990) as occurring in damp turf above 2,700 m, there are records from both sides of the Lesotho/KwoZulu-Notal border.

## SCROPHULARIACEAE

### *Glumicalyx lesuticus* Hilliard & B.L.Burtt

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation

The type specimen of this endemic species is from Soni Top at about 2,850 m. The species has been found at a

number of other widely dispersed localities from about 2,250 m to 3,230 m (Hilliard 1994). There is no apparent particular demand for the plant.

### *Jamesbrittenia jurassica* (Hilliard & B.L.Burtt)

Hilliard

Status: LR-lc

Endemism: Near-endemic?

Threats: Grazing

What is known about this endemic species is well documented in Hilliard (1994). The type specimen is from Soni Top on the Lesotho side of the border at 2,900 m, and it forms a small flowery mat on bare gravelly ground between 2,500 m and 3,230 m above sea level. There is also a record from Oxbow (a colour slide in the Edinburgh herbarium) and Olive Hilliard comments that 'it is clearly widely distributed over the high mountains of Lesotho'.

### *Zaluzianskya oreophila* Hilliard & B.L.Burtt

Status: LR-nt

Endemism: Near-endemic

The type specimen of this species of *Zaluzianskya* is from 2,900 m at Soni Top, Thaba-Tseko District, Lesotho (sheet 49A), and there are also records from the summit plateau nearby in KwoZulu-Notal (South Africa). There is another record from much further west in Lesotho at Likoloneng (sheet 34C). This justifies placing it in the category of LR-nt rather than DD. Described by Hilliard (1994) as an 'Eastern Mountain endemic'.



High-altitude sandstone rock pools support fragile aquatic ecosystems in Lesotho. (Photo: SABONET)

## ALOACEAE

### *Aloe ecklonis* Salm-Dyck

*Aloe kraussii* Baker

Status: DD

There are seven specimens of *Aloe kraussii* in ROML collected in the Rama Valley by Schmitz or Hargreaves in the period 1974–1984. However, Reynolds (1950) observed that 'plants from western Basutoland appear to be *A. ecklonis* rather than *A. kraussii*'. There are several other Lowlands and Foothills records (Jacot Guillarmad 1971). Listed as not being threatened in Hilton-Taylor. Also found in the Eastern Cape, KwaZulu-Natal (South Africa) and Swaziland (unconfirmed). Taxonomic uncertainty of this species in Lesatha.

## ANACARDIACEAE

### *Rhus pyroides* Burch. var. *gracilis* (Engl.) Burt Davy

Status: DD

Endemism: Endemic?

The population in Lesatha is not severely fragmented, but there are more than five localities. The variety is apparently known only from Lesatha but this cannot be established. The species co-occurs with *Rhus pyroides* var. *integrifolia*.

### *Smodingium argutum* E.Mey. ex Sond.

Status: DD

The sap of this plant is a skin irritant and its pollen causes painful blisters in sensitive subjects, hence its name. Madame Dieterlen found it in 'Motolone Gorge, Leribe' (sheet 14A). One of her specimens is in MASE, but when examined, it seemed to be close to *Rhus bolusii*. The late chief Theka Maama (1905–81) claimed to be familiar with the tree and provided the Sesotho name, *seloane-se-mpshehetse* 'the manster that sailed me', which confirmed knowledge of its poisonous properties (Tolukdor 1981). However, there has been no confirmed record of the tree for at least the past 50 years.

## ASCLEPIADACEAE

### *Asclepias eminens* (Harv.) Schltr.

Status: DD

There are five records of this asclepiad in ROML, three in MASE and one at SEHL (Kali & Hargreaves 1985) and it is also widespread in South Africa and Swaziland (Arnold & De Wet 1993). It does not appear to be rare. Listed as Vulnerable in Hilton-Taylor.

### *Asclepias xysmalobioides* Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic

This species is locally common on the summit of the Moloti (Hilliard & Burt 1986a). There are also records from the KwaZulu-Natal side of the watershed.

### *Cynanchum meyeri* (Decne.) Schltr.

Status: DD

This species appears from Arnold & De Wet (1993) to be a Namibian rather than a Lesatha endemic. *C. viens* Dietr. has been collected in Lesotho (sheets 14A, 32D) by Madame Dieterlen and Miss Archibald. Listed as Vulnerable/Endangered in Hilton-Taylor. Recorded from the former Cape and Transvaal in South Africa.

### *Schizoglossum elingue* N.E.Br. subsp. *purpureum* Kupicha

Status: DD

Endemism: Near-endemic?

Sehlabathebe has two records: Beverly 265, 1976; 497, 1976. Beverly 783 is from Kakstad, an Lesatha's

southeastern border. Found at an altitude of 2,000–2,700 m.

### *Schizoglossum montanum* R.A.Dyer

Status: DD

Endemism: Near-endemic

Rubright (1995) collected *S. montanum* from Mosafeleng, Tsotso-Lemena Range Management Area, Qocho's Nek District (sheet 57D). It is also found in the mountains of KwaZulu-Natal (South Africa). An eastern mountain endemic. Listed as Rare in Hilton-Taylor. Scott-Shaw assesses it as LR-lc.

## ASTERACEAE

### *Euryops evansii* Schltr. subsp. *dendroides* B.Nord.

Status: DD

Endemism: Endemic

There is one recorded site for this subspecies from 'Moletsunyane Gorge at Semonkong' (sheet 54A), where it was found by B. Nardensom. There is also one later 1995 record from Bakang, altitude 2,400 m (sheet 34C), Linder 6278, which is probably in the Balus Herbarium (AfriDev Consultants 1996).

### *Euryops inops* B.Nord.

Status: DD

Endemism: Near-endemic?

Almost all reports of this plant are from Lesotho: Meroreng in Mokhatlang District (sheet 39A); Lesobeng in Thabo-Tseko District; and Oxbow in Buthe-Buthe District. No herbarium records in Lesatha. Also in Cathedral Peak on the path to One Tree Hill (South Africa).

### *Gnaphalium griquense* Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic?

Found in Sehlabathebe: Beverly 141 and Haener 1821. *G. griquense* descends into neighbouring East Griqualand (Hilliard & Burt 1987). Listed as Rare in Hilton-Taylor. Also found in KwaZulu-Natal (South Africa).

### *Gymnopentzia bifurcata* Benth.

Status: DD

There are eight records from several parts of Lesatha in ROML for this well-known shrub from both Foothills and Moloti (1,800–3,000 m), and the species is listed in Arnold & De Wet (1993) as occurring in all four former provinces of South Africa. It is clearly neither rare nor data deficient. Listed as Rare/Vulnerable in Hilton-Taylor.

### *Helichrysum palustre* Hilliard

Status: DD

Endemism: Near-endemic

The location for the type specimen of this *Helichrysum* is (Hilliard 1977) 'Lesatho, plateau at headwaters of Lotheni river, c. 400 yards from exit of Bushman's River Pass, c. 3,050 m, Wright 753'. This description more likely fits the top of Giant's Castle Pass (in South Africa, but about 1 km from the Lesatha border) than it fits what is generally considered to be Bushman's River Pass, which is an alternative name for Longobalele's Pass. Only in the second case would it be a Lesatha specimen. The plant is typically found in marshy areas over an apparently wide area because it has been found in the Bokang Valleyhead Fen (sheet 25B) (Schwobe 1992) and also near Mathoe (sheet 17C) and near Sani Top (sheet 49A) (both records from Hilliard (1977)). Assessed as DD by Scott-Shaw.

### *Othonna burtii* B.Nord.

Status: DD

Endemism: Near-endemic

There are Lesotho records for this low shrub, which

forms cushions on exposed rocky surfaces, from Sehlabathebe (Hoener 1900) and 'Oxbow summit plateau' [= Mahlasela, sheet 16B] (Hirst 1996, deposited in Edinburgh Botanical Garden Herbarium). It is also found in KwaZulu-Natal and the Eastern Cape (Hilliard & Burt 1987). Listed as Rare in Hilton-Taylor. Scott-Shaw lists it as LR-lc.

### *Senecio austromontanus* Hilliard

Status: DD

Endemism: Near-endemic?

This plant has been recorded in Lesotho only from seepage areas and damp grassland at about 2,300–2,400 m in Sehlabathebe and nearby at Thamathu Pass (Hilliard & Burt 1987). It is widely distributed in elevated areas outside Lesatha including Swaziland (Arnold & De Wet 1993).

### *Senecio saniensis* Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic

The type specimen for this species was collected by Mrs D.C. Grice in February 1972 (Hilliard 1977) at the summit of Sani Pass at an altitude of 2,865 m on southwest facing cliffs, a description which would place the collecting site just within KwaZulu-Natal. There is one PRECIS record from Lesotho. Scott-Shaw (1999) regards the plant as a KwaZulu-Natal Orokensberg endemic, occurring from Sani Pass to the headwaters of the Latheni River. Listed as Rare in Hilton-Taylor. Scott-Shaw records it as LR-lc.

## BORAGINACEAE

### *Cynoglossum alticola* Hilliard & B.L.Burt

Status: DD

Endemism: Endemic

The type specimen is from the slopes of Ben Macdhui at 2,623 m on Lesotho's southern border and the plant has been recorded from Mokhotlong at 2,286 m (Hilliard & Burt 1986b).

### *Ehretia rigida* (Thunb.) Druce

Status: DD

Endemism: Near-endemic

Threats: Urban expansion

This small tree has a precarious fragmented foothold around Maseru, the capital. Another small area at Matseng Ha Sempe, 13 km north east of Maseru has just three individual bushes. The species has also been found on the south of the Mpepsana River bank and west and south of Qeme Plateau. Increasing urbanisation has apparently critically affected this species within Lesatha.

## CAMPANULACEAE

### *Wahlenbergia doleritica* Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic

Rare according to Hilton-Taylor (1996), this Drakensberg-Moloti endemic is recorded from Thamathu Pass and on basalt cliffs at Sehlabathebe (Hilliard & Burt 1987) at about 2,500 m.

## CRASSULACEAE

### *Crassula lanuginosa* Harv. var. *pachystemon*

(Schonland & Baker f.) Toelken

Status: DD

Hargreaves (1991) found *C. lanuginosa* in two sites in Lesotho. There are viable populations in the Eastern Cape (South Africa). Listed as Rare in Hilton-Taylor.



## CYPERACEAE

*Carex monatrappa* Nelmex

Status: DD

Endemism: Near-endemic

This sedge has been found at a number of localities from the mountains of Mokhotlong District as far as Soni Top, and has recently been found also nearby in KwoZulu-Notal (South Africa). Earlier PRECIS records were wholly from Lesotho. It needs to be monitored within the newly created Transfrontier Area.

## DRYOPTERIDACEAE

*Polystichum dracomontanum* Schelpe & N.C.Anthony

Status: DD

Endemism: Near-endemic

This Moloti–Droknensberg endemic fern occurs on the Droknensberg escarpment between 1,600 and 3,000 m (Schelpe & Anthony 1986) and has also been recorded at Sehlobothebe. Its habitat is along streambanks, boulder boses, screes and scrub, rarely also in forests. Found on lower Clörens Sandstone and Upper Bosalt formations.

## GERANIACEAE

*Pelargonium appasitifolium* Schltr.

Status: DD

Endemism: Endemic?

This species appears as a Lesotho endemic in Arnold & De Wet (1993), but from resources in Lesotho, no published reference could be found. There is also a report that the plant has recently been found.

## HYACINTHACEAE

*Scilla natalensis* Planch.

Status: DD

This large blue scilla was recorded as long ago as a manuscript recording a journey of February 1840 (but only published 150 years later as Arbusset (1991)). Arbusset noted that there is a bulbous root covered by layers that wrap around each other like an onion. It was and is used for treating a wide variety of human and animal illnesses, and indeed Arbusset observed 'there is no medicine it does not go into'. He saw the plant in the vicinity of Tsipo Ho Sekhobe (Lesotho sheet 24A, RSA sheet 2928AA). Distribution apparently Lowlands and Foothills, but there are few herbarium records, apart from Madome Dieterlen's collection from 'Motolone Gorge, Leribe District (sheet 14A).

## HYPOXIDACEAE

*Hypaxis hemeracallidea* Fisch. & C.A.Mey.

Status: DD

Threats: Collection

Widely distributed in southern Africa, including Botswana and Swaziland, this species is heavily utilised in Lesotho for its underground corm, which is in demand for treating prostate problems and urinary infections (Von Wyk, Von Oudtshoorn & Gericke 1997). The only Lesotho herbarium specimen seems to be in MASE. However, it has also been recorded from Tsotsi-Lemeno (sheet 57D) (Rubright 1995) and is being planted in Kotsie Botanical Garden as a rescue operation (Ntloko 2001).

## IRIDACEAE

*Dierama jucundum* Hilliard

Status: DD

The type specimen is from the form Fetconi Pass, near

Borkly East in the Eastern Cape (South Africa). This graceful flower has only ever been recorded twice and the other record is from Lesotho (Schmitz 7891 RQML and PRE). It was collected 'in a big tuft on a dry rocky slope, flowers pale mauve' in October 1977 between Mofeteng and Mohole's Hoek (believed to be sheet 51C) in southern Lesotho about 120 km to the north-northwest of the first site. No further finds have been made of this attractive Dierama (Hilliard & Burt 1988; 1991).

*Hesperantha cracapsis* Hilliard & B.L.Burt

Status: DD

Endemism: Endemic

This species is regarded as a Lesotho endemic by Hilliard & Burt (1986c). The type specimen is from 'Lesotho, Mokhotlong distr., above Mashoi Pass, c. 2,870 m, 1977, Hilliard & Burt 10489 (E holo., NU iso.)'. There is a problem with this location, because neither of the two places known as Mashoi Pass are in Mokhotlong District, and both are higher than 2,870 m, which would better fit Soni Top. On balance it seems that the plant must have been collected at the Mashoi Pass which straddles the Lesotho border (sheet 48D). Other recorded sites are Soni Top (sheet 49A) and 'Block Mountains' [= Kotisephola] c. 3,050 m (sheet 48B). Hilliard & Burt remark that the plant is found in short wet turf, and flowers in November: 'it is certainly elsewhere in the mountains of Lesotho.'

*Ramulea luteaflara* (M.P.de Vos) M.P.de Vos var.

*sanisensis* M.P.de Vos

Status: DD

Endemism: Near-endemic

Threats: Habitat degradation, grazing

The type specimen for this variety is from flat grassland of Soni Top on the Lesotho side of the border (De Vos 1983). It is obviously under threat from grazing animals. It is listed as Vulnerable in Hilton-Taylor. Scott-Show records it from KwoZulu-Notal (Cobhom) where it is Vulnerable.

## LEGUMINOSAE: MIMOSOIDEAE

*Elephantorrhiza elephantina* (Burch.) Skeels

Status: DD

The crushed underground stem of this plant is used to stop bleeding and to treat syphilis and intestinal disorders. Distribution Lowlands and Foothills.

## LEGUMINOSAE: PAPILIONOIDEAE

*Lessertia glabricaulis* L.Bolus

Status: DD

Endemism: Endemic

Threats: Grazing, erosion

This species is very rare as there is only one record in the PRECIS database, which is from the Mokhoaneng Plateau near Pitseng (sheet 14D). There is also one specimen in MASE, as listed in Koli & Hargreaves (1985), but without details of collecting locality.

*Lessertia thodei* L.Bolus

Status: DD

Endemism: Near-endemic

Details of this legume, found at altitudes from 2,100–2,900 m on rocky grassland, are given by Hilliard & Burt (1987) who cite a Sehlobothebe record by Jacot Guillormod, Getliffe & Mzomone (70). Also recorded from the Free State and KwoZulu-Notal (South Africa).

*Rhynchosia dieterlenae* Baker f.

Status: DD

Endemism: Endemic

Threats: Collection

According to Jacot Guillormod (1971), the only record of this plant is from the 'Motolone Gorge (sheet 14A), Dieterlen 840'. The roots are used for medicinal purposes. The species has a taproot, so the entire plant is removed for usage.

## MALVACEAE

*Anisadontea julii* (Burch. ex DC.) Bates subsp.

*prastrata* (E.Mey. ex Turcz.) Bates

Status: DD

A very restricted wild population has been located in Tele-Tele in Quthing district close to the border with the Eastern Cape (Moy, in press), where it is also present. Known from near the former Transkei border. Probably occurs more widely in Lesotho, but is currently known only from a linear strip near the former Transkei. Herbarium specimens from Lesotho have localities mainly along the Free State border.

## MESEMBRYANTHEMACEAE

*Delaspermia ashtanii* L.Bolus

Status: DD

This is a high altitude mesembryanthemum also found in KwoZulu-Notal and the Eastern Cape (South Africa). Meekins, Hargreaves and Mochobo (1988) recorded it from the Molibomoto and Bokong confluence of Kotse now occupied by Kotse Reservoir. There was a rescue operation in 1995 and 1996 to save the plants before inundation (Ntloko 2001).

*Delosperma clavipes* Lavis

Status: DD

Endemism: Endemic?

This is probably a Lesotho endemic, known from the wetlands at the top of the plateau behind Mofiko-Lisui Pass (Meekins et al. 1988) and from the slopes of Mochache 2,880 m (Hargreaves 1989a).

*Delosperma nubigenum* (Schltr) L.Bolus

Status: DD

Hargreaves reported this yellow-flowering species also from Mochache (1989a). Hirst (1996) has published a photograph of *D. nubigenum* in The Rock Garden, without mentioning the locality.

*Rabiea lesliei* N.E.Br.

Status: DD

Endemism: Endemic

Threats: Urban expansion

The only record at present available in Lesotho for this mesembryanthemum is that it is listed as on apparent Lesotho endemic in Arnold & De Wet (1993). Known only from the Moseru area.

## ORCHIDACEAE

*Brownleea recurvata* Sond.

Status: DD

This orchid has a widespread distribution in the Eastern Cape, extending just into the Western Cape and with an outlier in Mpumalanga (South Africa). There is a Lesotho record from Sehlobothebe (Hoener 1800, 23 ii 1977).

*Corycium alticola* Parkman & Schelpe

Status: DD

Endemism: Endemic

This is quite a rare orchid, known only from a few widely dispersed locations in the Eastern Cape, KwoZulu-Notal and Lesotho (Linder & Kurzweil 1999): 'found in damp grassland from 1,950–2,400 m.' The only known Lesotho record seems to be from Thobono-Tsekonyono near Romo (sheet 33C).

*Disa basutarium* Schltr.

Status: DD

Endemism: Near-endemic

This orchid grows on damp turf slopes above 2,600 m (Hilliard & Burt 1987) and Scott-Show (1999) mentions 'summit of the Lesotho and KwoZulu-Notal Droknensberg'. The cited reference in Hilliard & Burt (1987) is Linder 1034, but the location is not given. This species is Doto Deficient until more information is available. Scott-Show assesses it as LR-lc.

***Disa cephalotes* Rchb.f. subsp. *frigida* (Schltr.) H.P.Linder**  
**Status: DD**  
 Endemism: Near-endemic  
 This high-altitude orchid subspecies is stated (Linder & Kurzweil 1999) to be 'rare in Lesotho and KwaZulu-Natal; in large or small populations in dry to damp grassland at 3,000 m on the summit of the Drakensberg'. Data deficient until extent of Lesotho occurrences is clarified. Listed as Rare in Hilton-Taylor. Also in Free State and possibly in KwaZulu-Natal (South Africa). Scott-Shaw assesses it as LR-lc.

***Disa oreophila* Bolus subsp. *erecta* H.P.Linder**  
**Status: DD**  
 Endemism: Near-endemic  
 It is stated for this orchid subspecies (Linder & Kurzweil 1999) that 'it is occasional in the Drakensberg in the Eastern Cape, Lesotho and KwaZulu-Natal; on rock ledges and damp grassy slopes between 2,250 and 2,700 m, usually growing in soils derived from basalt'. Data deficient until extent of Lesotho occurrences is clarified. A record of this orchid is in MASE (Kali & Hargreaves 1985).

***Disa tripetaloides* (L.f.) N.E.Br.**  
**Status: DD**  
 Not a Lesotho species but a species of the Cape and KwaZulu-Natal coasts. Possibly the intention was to include *D. taysanii* which is found in the Eastern Cape and of which there are two known records from sheets 16A and 16C. Listed as Rare/Vulnerable in Hilton-Taylor.

***Satyrium microrrhynchum* Schltr.**  
**Status: DD**  
 This rare orchid is known from only six localities, stretching 470 km from Mpumalanga to the Eastern Cape (South Africa). It is found on grassy and sometimes stony or moist slopes from 1,600–3,300 m (Linder & Kurzweil 1999). There is one Lesotho record, Hoener 1972 from the Rock Pools area in Sehlabathebe (Hoener 1979). Scott-Shaw assesses it as LR-lc.

POACEAE

***Agrostis subulifolia* Stapf**  
**Status: DD**  
 Endemism: Near-endemic  
 There are several records of this grass from Lesotho. ROML specimens include Morris from Ha Lejone and Killick from Oxbow. Backéus' specimens from Kholong-la-Lithunya 3,240 m (sheet 17C), and also from the southwest of Mont-aux-Sources are in Sweden (UPS) (Backéus 1988). Subalpine grassland to Drakensberg Alpine Tundra and occupies damp sites mainly in sedge meadows. Listed in Scott-Shaw as LR-lc. It is also found in South Africa (KwaZulu-Natal).

***Anthoxanthum brevifolium* Stapf**  
**Status: DD**  
 Endemism: Near-endemic  
 Subalpine grassland to Drakensberg Alpine Tundra and occupies damp sites mainly in sedge meadows. Listed in Scott-Shaw as LR-lc. This is a rare Drakensberg endemic. It is also found in KwaZulu-Natal (South Africa). Gibbs Russell et al. (1990) state that except for the very short and broad leaf blades, this species cannot be separated from *A. ecklonii*, and therefore cannot be regarded as a separate taxon. Sixteen specimens of *A. ecklonii* at ROML and six at MASE were measured. There was a wide range in leaf sizes and the broadest ones were not necessarily short. From Lesotho collections it is not possible to separate *A. brevifolium* from *A. ecklonii*.

***Aristida monticola* Hern.**  
**Status: DD**  
 Endemism: Near-endemic  
 This is a high altitude grass from the eastern mountains. ROML has a specimen collected by Du Toit in 1977 between Bushmen's Nek and Sehlabathebe (ROML 1863) at 2,400 m. This record, because of its altitude, probably refers to Lesotho. Scott-Shaw (1998) mentions

this grass, but provides no clear record from Tsehlanyane or Upper Bakang. The grass is known from high altitude sedge meadows in KwaZulu-Natal. It is presumably a Maloti–Drakensberg endemic, but definite Lesotho records are still needed. Listed in Scott-Shaw as LR-lc.

***Bromus firmior* (Nees) Stapf**  
**Status: DD**  
 Endemism: Near-endemic  
 This grass, which also occurs in the Free State and KwaZulu-Natal, is 'locally common in Senqunyane valley, also in Bakang and Jordane valleys altitude 2,400 m 2928AC' (AfriDev Consultants 1996). There is a duplicate ROML record from sheet 34C. It is likely that it will be found elsewhere in Lesotho. Listed in Scott-Shaw as LR-lc.

***Colpodium drakensbergense* Hedberg & I.Hedberg**  
*Colpodium hedbergii* (Melderis) Tzevelev  
**Status: DD**  
 Endemism: Near-endemic?  
 This grass genus is confined to the 'archipelago' of high African mountain summits (White 1978), and this particular species has been found in Lesotho (Schmitz 1984). Listed as Rare in Hilton-Taylor. Also in KwaZulu-Natal (South Africa).

***Festuca dracomontana* H.P.Linder**  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Habitat degradation  
 High-altitude grass. The type specimen is from a slope bordering Letsheng-la-Letsie, sheet 748 (RSA sheet 3028AC) (Linder 1986). ROML has a duplicate from P.C.V. du Toit 2714, also from near Letsheng-la-Letsie. The grass is mentioned in Scott-Shaw's 1998 checklist from Bokong, Leribe District (presumably sheet 25B), but with no details about exact locality. *F. dracomontana* also occurs in the Mpumalanga Drakensberg, far north of Lesotho (Arnold & De Wet 1993). Recent high rates of cattle theft between southern Lesotho and the Eastern Cape have resulted in sufficient insecurity in the border zone that people can no longer graze animals there. As a result the grassland (including that around the lake (Letsheng-la-Letsie)) has recovered from its previously overgrazed status, although this may only be a temporary phenomenon. Listed as Rare in Hilton-Taylor.

***Festuca killickii* Kenn.-O'Byrne**  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Habitat degradation  
 This grass has a wider distribution than *Urginea saniensis*. It is confined to high areas in the Drakensberg from 1,980–2,500 m, and was found by O'Byrne at Sehlabathebe, which is the only Lesotho record. Listed in Scott-Shaw as LR-lc.

***Merxmuellera aureocephala* (J.G.Anderson) Conert**  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Grazing, fire  
 Although there are no records from Lesotho, this species is likely to occur here, because it has been recorded on basalt slopes and sandstone ridges in the southern KwaZulu-Natal Drakensberg (South Africa) (Hilliard & Burt 1987). Listed in Scott-Shaw as LR-lc.

***Merxmuellera guillarmodiae* Conert**  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Grazing, fire  
 There is one specimen in ROML from Sani Top in Lesotho (sheet 59A), P.C.V. du Toit 2206, collected in 1977 on top of the escarpment on dark brown gritty, gravelly, loamy, humus-rich soil (illustrated in Kali & Hargreaves (1985)). It has also been found in the LHWP Phase 1A Area (Loxton, Venn & Associates 1993). This grass also occurs in KwaZulu-Natal (Arnold & De Wet 1993). Listed in Scott-Shaw as LR-lc.

***Pentastichis praecox* H.P.Linder**  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Grazing, fire  
 This high-altitude grass appears as a Lesotho endemic in Gibbs Russell et al. (1990) and Arnold & De Wet (1993). The distribution shows two locations within Lesotho near the eastern border, and the plant is said to flower in September and to be found in 'saur grassland in the montane belt' (Gibbs Russell et al. 1990). A reference to Linder & Ellis (1990) is given in Gibbs Russell et al. (1990), but without full citation details. Scott-Shaw assesses it as LR-lc and considers it a rare Drakensberg endemic.

***Phacelurus franksiae* (J.M.Wood) Clayton**  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Grazing, fire  
 This has been mentioned as a KwaZulu-Natal grass by Hilliard & Burt (1987), but there is no known Lesotho record. Listed in Scott-Shaw as LR-lc.

***Setaria obscura* de Wit**  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Habitat degradation, grazing, fire  
 This plant appears to be a KwaZulu-Natal endemic. Listed in Scott-Shaw as LR-lc.

PORTULACACEAE

***Anacampseros rufescens* (Haw.) Sweet**  
**Status: DD**  
 Definite Lesotho records of this species are over 40 years old, PRE Dieterlen 625 from Leribe and Paroz from Thabana-Marena (Jacot Guillarmod 1971). *Anacampseros* material in ROML collected by Hargreaves (Hargreaves & Kali (1985), 3744 and 3751) still has to be identified to species level. Listed as Indeterminate in Hilton-Taylor; also listed in the Eastern Cape, KwaZulu-Natal, Free State (South Africa) and Swaziland. According to PRECIS, this species occurs only in South Africa.

ROSACEAE

***Prunus africana* (Hook.f.) Kalkm.**  
**Status: DD**  
 This tree was collected by Hoener FKH 2027 from the Rock Pools area in the shelter of a sandstone outcrop in Sehlabathebe, 1978. This is the only known record from Lesotho, and the tree no longer survives. The species occurs nearby, east of the escarpment, and seeds may be dispersed by birds. It closely resembles *Prunus serotina*, an exotic. *P. serotina* has been planted on the university campus; there have been several examples of trees coming up in the wild as a result of bird dispersal. One specimen was observed in the Maphatong Gorge. Widely known from many countries in Africa.

THYMELAEACEAE

***Dais cotinifolia* L.**  
**Status: DD**  
 Unlike *Morella serrata*, *Dais cotinifolia* has both a present and known past limited distribution close to Berea Mission, on escarpments northeast of Lesotho's capital. The one exception to this is a record by Scott-Shaw (1998) from Tsehlanyane (Lesotho sheet 15D, RSA sheet 2828CD). The species could have been introduced to Lesotho.

***Gnidia singularis* Hilliard**  
**Status: DD**  
 Endemism: Endemic  
 There is a single record for this plant from the Lesotho side of the border in the Sani Top area (Arnold & De Wet 1993). It was assessed by Hilton-Taylor as Indeterminate.



# Malawi



## Gladys Msekandiana\* & Enoch Mlangeni\*

### Introduction

Malawi is a small country (118,000 km<sup>2</sup>) with a total land area of 94,276 km<sup>2</sup>; the remainder is made up by Lake Malawi. The country is divided into three regions—Northern, Central, and Southern Regions—and is characterised by widely varied relief patterns throughout its entire area. A total of 53 natural regions have been identified (Agnew & Stubbs 1971). The most important of the relief features include the Rift Valley Scarp Zone (most prominent in the north), Lakeshore plains and the Shire Valley (at about 60 m altitude with a hot climate), a high plateau and plains, and the high-altitude hill zone. These variations in relief—steep habitat gradients in a heterogeneous environment—are reflected in the floristic diversity of the country. Indigenous vegetation is predominantly semi-deciduous; miombo woodlands are commonly typified by *Brachystegia* and *Julbernardia* species. The known key areas of endemism include Mount Mulanje in the south and the Nyika Plateau in the north; both lie mostly above

the 2,000 m altitude contour.

The floristic composition of Mount Mulanje comprises mostly *Widdringtonia* forest, thicket, shrub, and grassland. Historically, Mount Mulanje has 50 km<sup>2</sup> of Afromontane forest (montane and sub-montane) and approximately 18 km<sup>2</sup> of mid-altitude forest on its slopes and gorges.

The Nyika Plateau is shared with Zambia and comprises a diversity of forest and grassland species. The slopes below 1,900 m a.s.l. consist primarily of *Brachystegia* woodland and are poorly known compared to the plateau area (La Croix *et al.* 1991).

Unfortunately, the forests of Mount Mulanje and those bordering the Nyika National Park are at the moment facing a growing threat from human influence. Malawi is one of the most densely populated countries in sub-Saharan Africa with a population growth rate of 3.3% per annum (Ministry of Forestry, Fisheries and Environmental Affairs 1998). Some 85% of the population depends on subsistence ag-



Ruu Gorge (Mount Mulanje) destruction by tea estates. (Photo: J. Burrows)

\*National Herbarium, Zomba, Malawi

**Capital:** Lilongwe, largest city is Blantyre

**Area:** 118,484 km<sup>2</sup>

**Languages:** English, Chewa (both official), Lomwe, Tumbuka, Yao

**Currency:** Malawian kwacha (MK)

**Total plant species:** 5,500

**Total plant endemics:** 122

**Total RDL plants:** 247

**Focal RDL institutions:** MAL, PRE

**Number of Protected Areas:** five National Parks, several Game Reserves and Forest Reserves and a proposed Transfrontier Park.

**Population:** 10,787,800 **Growth Rate:** 3.3% **Density:** 109.2 people/km<sup>2</sup>

**Phytogeography:** Predominantly Zambezian with frequent Afromontane elements.

**Flora:** Predominantly miombo woodland, with drier Zambezian woodland in the south, montane forest and grassland at higher elevations, and patches of lowland forest on the shores of the northern part of Lake Malawi, Nyika Plateau, and the lower slopes of Mount Mulanje.

**Sources:** Anonymous 2000, White 1983

riculture. Fuelwood accounts for 93% of Malawi's energy consumption, and the rate of deforestation is estimated at 3.4% per annum—this being the highest in southern Africa (Ministry of Forestry, Fisheries and Environmental Affairs 1998). There is, therefore, enormous human pressure on natural forests. In unprotected areas, the forests occur mostly on customary land and consequently the rate of biodiversity loss is suspected to be very high. This creates the need for a RDL for Malawi, a prerequisite for establishing conservation priorities.

## Methods

As a starting point, a draft RDL was compiled from the literature and the list was circulated to various specialists. The IUCN 1994 system was used; inferences to deal with uncertainty (relating to distribution range and the extent of threats) were based on methods outlined in Golding & Smith (2001).

Institutions that were directly involved in compiling the RDL were Kew, the National Herbarium and Botanic Garden of Malawi, the Forestry Research Institute of Malawi, Chancellor College, and the SADC Gene Bank.

## Results and Discussion

Malawi has a total number of 5,000–6,000 species. A total of 248 RDL taxa is presented here (Table 1). About 52% (128 taxa) is regarded as threatened (*Critically Endangered*, *Endangered* or *Vulnerable*). A large proportion of taxa (63) has been categorised as *Data Deficient*.

Some 114 of these taxa (50%) are confirmed as being restricted to Malawi and a further eight are probably endemic. Thirty-one are near-endemic (distributed in ad-



**Pit-saw activities taking place in evergreen forest areas in southern Malawi. (Photo: SABONET)**

jacent areas of neighbouring countries). The list of endemic taxa presented here is based on the list compiled by Hargreaves (1982), with additional information extracted from volumes of *Flora zambesiaca* and related publications. There is a need for the production of a national checklist and for a list of endemics.

The families with the highest representation on the RDL are the Orchidaceae (51), Asteraceae (22), Aloaceae (18), and Rubiaceae (18). This is probably because more information is available for charismatic families such as the orchids than for less charismatic groups (La Croix *et al.* 1991). It is unlikely that these skewed figures represent the reality of species loss in Malawi; the figures should be seen as a starting point for further research.

## Threats

The major threats to plant species in Ma-

lawi are:

- Habitat loss through human settlements
- Alien plant infestations
- Forestry exploitation targeted towards removing certain woody species
- Fire
- Agriculture
- Urban expansion
- Afforestation
- Deforestation
- Other species are harvested for medicinal purposes (*Prunus africana* and *Warburgia salutaris*), and timber and fuelwood or charcoal (*Pteleopsis myrtifolia*, *Psychotria zombamontana*, and *Ixora* species).

The possibility of bauxite mining on Mount Mulanje may also pose a threat to most species there. It is noteworthy that a large number of the endemic plants of Malawi are found on Mount Mulanje. Perhaps Mulanje ought to be made a National Park to preserve its unique plants in the same way that unique animals have been preserved elsewhere.

## Wildfires

Wildfires are definitely a threat to indigenous species in Malawi. In Malawi, plantation fires are monitored by an elaborate system, but natural forests are not monitored with similar vigilance. Data on the frequency of fires, the extent of the damage, the time of the year that fires occur, and whether or not fires occur mostly during the day or night, are not available. This lack of basic data makes fire management very difficult.

**Table 1. Results of RDL assessment for Malawi.**

Category	Number of taxa
Total species in Malawi	5,000–6,000
Listed on the RDL	247
Endemics	114
Possibly endemic	8
Near-endemics	31
Possibly near-endemic	1
Extinct (EX)	5
Critically Endangered (CR)	25
Endangered (EN)	14
Vulnerable (VU)	89
Lower-Risk near threatened (LR-nt)	24
Lower-Risk least concern (LR-lc)	27
Data Deficient (DD)	63





**National map of Malawi.**

### Human Pressure on Indigenous Species

The increase in human population results in an increase in the demand for services and products offered by the forests, more land for settlement and cultivation of crops that may lead to deforestation, and a possibility for some species to go extinct (globally, locally, or regionally). In Malawi, there is also an increased demand for edible tubers of orchids belonging to the genera *Habenaria*, *Satyrion*, and *Disa*. There are also other orchid species that are used for making *chikanda*, an edible product that is also sold on the markets (this is also the case in Zambia).

### Invasive Species

The most serious invasive species in Malawi are *Lantana camara*, *Rubus ellipticus*, and *Prosopis*. Some RDL taxa that have been affected are *Phyllanthus confusus*, *Rhus monticola*, *Erica nyanana*, *Helichrysum whyteanum*, and *Lopholaena whyteana*.



**Participants at the Red List Workshop held in Mangochi. (Photo: J.S. Golding)**

Other invasive species that affect aquatic life are *Eichhornia crassipes*, *Salvinia molesta*, *Myriophyllum aquaticum*, and *Azolla filiculoides*.

### Other Threatened Species

In Malawi we have other species that are also considered threatened because of their utility (Campbell 1996). These species, although widespread beyond the borders of Malawi, have been excluded from the RDL owing to a lack of data relating to trade, rate of utilisation, and regeneration statistics. *Widdingtonia nodiflora*, *Colophospermum mopane*, and *Khaya anthotheca* are

used as timber, for charcoal production, and fuelwood. Two major species that are heavily harvested in Malawi for carvings are *Combretum imberbe* and *Dalbergia melanoxylon*. These species need to be monitored because they are fast becoming rare in Malawi.

### Conclusions

The Government of Malawi, recognising the importance of biological diversity in the socio-economic development of the country, and realising the severe ongoing destruction of ecosystems and habitats, has put in place various policies, legislation, strategies, and programmes to curtail the destruction of biological resources. The National Environmental Action Plan (NEAP) clearly spells out strategies and action plans needed to conserve, sustainably utilise, and manage the country's biological resources. Through the mandate of the Department of Research and Environmental Affairs, Government ensures that all sectoral policies are harmo-

nised. The Department of Environmental Affairs produced an Environmental Management Bill that is aimed at providing a legal framework for regulating the conservation and management of all the natural, biological, and environmental concerns in the country. The Bill spells out that the biological diversity should be determined as far as possible, in terms of threatened species, and that strategies should be devised for the better protection and conservation of rare and endemic species of fauna and flora. The Bill also states that rescued species should be re-introduced into their natural habitats. The Bill has already been passed by Parliament (Seyani & Kamundi 1997).

Malawi is a developing country and industrialisation and urbanisation are on the increase. This merits the monitoring of threatened taxa to prevent local, regional, and global extinctions.

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# EXTINCT & THREATENED

## ACANTHACEAE

*Isoglossa milanjiensis* S.Moore

Status: CR B1B2c

Endemism: Endemic

Threats: Forestry exploitation, alien plant infestation, fire

Distribution: South

Restricted to Mount Mulonje.

## ALOACEAE

*Aloe arborescens* Mill.

Status: VU B1B2c

Threats: Agriculture

Distribution: South, Central

On mountain tops in Southern and Central Province. Widespread on Mount Mulonje. There may still be one or two remaining localities on the top of the mountains surrounding Blantyre. Habitat is declining. However, it is very well protected. Well represented and widely distributed outside Malawi.

*Aloe buchananii* Baker

Status: EN B1B2bcdC2a

Distribution: South, Central

Found throughout most of the southern highlands. It is isolated on a few mountain tops. Widely distributed outside Malawi.

*Aloe bulbicaulis* Christian

Status: VU D2

*Aloe buettneri* A.Berger

Distribution: South, Central

There may be many individuals. No specimens in Malawi's National Herbarium. Also known to occur in Zambia, Angola, Tanzania, Zimbabwe and so forth.

*Aloe cameroni* Hemsley var. *dedzana* Reynolds

Status: CR B1B2bc

Endemism: Endemic

Threats: Agriculture, forestry exploitation

Distribution: Central

Several field surveys have been unable to find it in the wild. Well-known from cultivation. Last seen in 1980 on the escarpment just below Dedzo Mountain. Very unlikely that it still exists in the wild.

*Aloe cannellii* L.C.Leach

Status: CR B1B2bdeD

Threats: Habitat degradation

Distribution: Central

Commonly thought to only occur in Mozambique.

However, there is an account of the species occurring in central Malawi where there is much habitat degradation. This may need further investigation.

*Aloe chabaudii* Schonland var. *chabaudii*

Status: CR B1B2bcC2a

Threats: Habitat degradation, collection

Distribution: South, Central, North

There are two forms of *Aloe chabaudii*, namely *Aloe chabaudii* var. *milanjanus*—not confined to Mount Mulonje as the name suggests—and *Aloe chabaudii* var. *chabaudii*. The latter consists mainly of two very widely separated subpopulations. The main subpopulation in the extreme south is 10 x 20 m. The other subpopulations are much smaller. The distribution range is wide.

*Aloe cryptopoda* Baker

Status: VU B1B2bce

Distribution: South, Central

The distribution range is wide, but subpopulations are patchy and discrete. Usually on rocks near water.

*Aloe excelsa* Berger var. *brevifolia* L.C.Leach

Status: CR B1B2cde D

Distribution: South

Now sunk under *A. excelsa*. However, the varietal name is still in use in Malawi.

*Aloe greatheadii* Schonland

Status: CR B1B2cdeD

Distribution: South

Widely distributed in other countries. Also referred to as *A. greatheadii* var. *greatheadii* but the varietal name is seldom used in Malawi.

*Aloe lateritia* Engl.

Status: CR B1B2cD

Threats: Habitat degradation, urban expansion

Distribution: North

Well represented outside Malawi. Also referred to as *A. lateritia* var. *lateritia* but the varietal name is seldom used in Malawi.

*Aloe mawii* Christian

Status: VU C1C2a

Distribution: South, North

Also known from Tanzania and Mozambique.

*Aloe myriacantha* (Haw.) Schult. & J.H.Schult.

Status: VU C1 C2a

Threats: Habitat degradation, urban expansion

Distribution: South, Central, North

Used to be on the Kirk Range but not found there anymore. Apparently reparted from the Mofingos (Zambia); not found on the Nyika. Only four reported instances in Malawi although no specimens in the Malawi National Herbarium. Also recorded from South Africa, through to Kenya and Tanzania. Looks like grass and grows in grass, so very inconspicuous.

*Aloe suffulta* Reynolds

Status: CR B1B2cdeD

Threats: Habitat degradation, urban expansion

Distribution: South

This species could be extinct by now. Restricted to southern Malawi. Commonly thought only to occur in Zimbabwe and Mozambique. However, reported to also occur in Malawi.

*Aloe swynnertonii* Rendle

Status: VU A1aB1B2deC2a

Threats: Fire

Distribution: South, Central

Taxonomic uncertainty that needs to be resolved.

*Kniphofia monticola* S.Blackmore

Status: VU D2

Endemism: Endemic

Distribution: South

Restricted to Mount Mulonje. Initially suggested to be categorised as Data Deficient.

*Kniphofia mulanjeana* S.Blackmore

Status: VU D2

Endemism: Endemic

Distribution: South

Initially suggested to be categorised as Data Deficient.

## ANACARDIACEAE

*Rhus monticola* Meikle

Status: VU B1B2cd2

Endemism: Endemic

Threats: Fire, invasive species

Distribution: South

Restricted to Mount Mulanje.

## APIACEAE

*Pimpinella mulanjensis* C.C.Towns.

Status: VU B1B2cd2

Endemism: Endemic

Threats: Fire, invasive species

Distribution: South

Restricted to Mount Mulonje.

## ASTERACEAE

*Aster milanjanus* S.Moore

Status: VU B1B2cd2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulonje.

*Berkheya johnstoniana* Britten

Status: CR B1B2c

Endemism: Endemic

Threats: Fire, alien plant infestation, mining

Distribution: South

Restricted to Mount Mulonje. The development of a bauxite mine could be a threat.

*Bothriocline milanjiensis* (S.Moore) Wild & G.V.Pope

Status: VU B1B2cd2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulonje.

*Brachythrix sonchoides* Wild & G.V.Pope

Status: VU B1B2cd2

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: North

In Malawi, this species is found only on the Nyika Plateau. The locality in Zambia is about 160 km east, and the distribution is probably continuous. Known from fewer than five herbarium collections.

*Helichrysum bullatum* S.Moore

Status: VU B1B2cd2

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: South

Restricted to Mount Mulonje.

*Helichrysum densiflorum* Oliv. subsp. *densiflorum*

Status: VU B1B2cd2

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: South

Restricted to Mount Mulanje.

*Helichrysum dichroölepis* Brenan

Status: VU D2

Endemism: Near-endemic

Distribution: South

The taxonomic identity of this species may be in dispute.

*Helichrysum hilliardiae* Wild

Status: VU B1B2cd2

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: North

Known only from the Nyika Plateau. Known from about five collections at three localities, one of which is unspecified in Zambia. Found in secondary forest at stream sides or in swampy ground. Possibly affected by taurist or visitor impacts.



**Helichrysum poliooides** B.L.Burt  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Fire, alien plant infestation  
Distribution: South  
*The identity of this species may be questionable.  
Restricted to Maunt Mulanje.*

**Helichrysum sordidum** S.Moore  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Fire, alien plant infestation  
Distribution: South  
*The identity of this species may be questionable.  
Restricted to Mount Mulanje.*

**Helichrysum tithonioides** Wild  
**Status:** VU B1B2c  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: North  
*Restricted to Nyika Plateau. Found in swampy marshy ground. The species is represented by a number of collections, which implies that it is common or fairly conspicuous (locally abundant). Possibly affected by tourist or visitor impacts.*

**Helichrysum whyteanum** Britten  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Fire, alien plant infestation, forestry exploitation  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Lopholaena whyteana** (Britten) Phill. & C.A.Sm.  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Fire, alien plant infestation  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Senecio peltophorus** Brenan  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Maunt Mulanje. The identity of this species may be questionable.*

**Vernonia fractiflexa** Wild  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Distribution: North  
*Restricted to the Nyika Plateau. Known only from the type collection. Several surveys have taken place in the vicinity of the type locality, yet this species has not been collected again.*

**Vernonia kawoziensis** F.G.Davies  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Habitat degradation?  
Distribution: North  
*Restricted to the Nyika Plateau. Known from only two collections at the type locality. The species grows in Brachystegia woodland at an altitude of 1,890 m.*

**Vernonia milaniana** S.Moore  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Fire, alien plant infestation  
Distribution: South  
*Restricted to Maunt Mulanje.*

BALSAMINACEAE

**Impatiens quisqualis** Launert  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Afforestation, deforestation  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Impatiens shirensis** Baker f.  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Habitat degradation, forestry exploitation  
Distribution: South  
*Restricted to Maunt Mulanje. The habitat is known to be threatened by pitsaw activities.*

BEGONIACEAE

**Begonia nyassensis** Irmsch.  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Maunt Mulanje.*

BUXACEAE

**Buxus nyasica** Hutch.  
**Status:** EN B1B2ac  
Endemism: Endemic?  
Distribution: South, North, Central  
*Restricted to Maunt Mulanje, but uncertain.*

CANELLACEAE

**Warburgia salutaris** (Bertol.f.) Chiov.  
**Status:** EN A1ac  
Threats: Collection  
Distribution: South  
*Harvested for medicinal purposes. Also recorded from Zimbabwe, South Africa, Swaziland and possibly other countries.*

CAPPARACEAE

**Cleome densifolia** C.H.Wright  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Habitat degradation, forestry exploitation  
Distribution: South  
*The habitat is known to be threatened by pitsaw activities.*

CRASSULACEAE

**Crassula globularioides** Britten forma pilosa R.Fern.  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Crassula sarcocaulis** Eckl. & Zeyh. subsp. rupicola Toelken var. milaniana R.Fern.  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Maunt Mulanje.*

CUPRESSACEAE

**Juniperus procera** Endl.  
**Status:** EN B1B2cD2  
Distribution: North  
*Also recorded from Zimbabwe, East Africa and Central Africa. There is evidence of poor regeneration owing to fire exclusion on the Nyika Plateau.*

**Widdringtonia whytei** Rendle  
**Status:** EN A1abcd B1B2abcde  
Endemism: Endemic  
Threats: Forestry exploitation, alien plant infestations, fire  
Distribution: South  
*Restricted to Maunt Mulanje. Patches of forest associated with high peaks. The habitat is known to be threatened by pitsaw activities. Alien plant infestation*

*of Pinus patula is a serious threat. The area is protected by a number of firebreaks.*

CYATHEACEAE

**Cyathea mossambicensis** Baker  
**Status:** VU D2  
Threats: Habitat degradation  
Distribution: North  
*Species has a restricted distribution. Apparently also known from Mozambique and Zimbabwe.*

CYPERACEAE

**Pycreus spissiflorus** C.B.Clarke  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Tetraria milanensis** J.Raynal  
**Status:** CR B1B2c  
Endemism: Endemic?  
Threats: Fire  
Distribution: South  
*Restricted to Maunt Mulanje. However, it has been reported that the species may also exist in Barberton, South Africa.*

ERICACEAE

**Erica austronyassana** Alm & T.C.E.Fr.  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Erica nyassana** (Alm & T.C.E.Fr.) E.G.H.Oliv.  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Fire, alien plant infestation  
Distribution: South  
*Restricted to Maunt Mulanje.*

EUPHORBIACEAE

**Clutia brassii** Brenan  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Fire  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Clutia conferta** Hutch.  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Fire  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Euphorbia lividiflora** L.C.Leach  
**Status:** VU D1D2  
Distribution: South  
*Recorded from Mozambique, Zimbabwe and Tanzania.*

**Euphorbia milaniana** L.C.Leach  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Fire  
Distribution: South  
*Restricted to Maunt Mulanje.*

**Phyllanthus confusus** Brenan  
**Status:** VU B1B2cD2  
Endemism: Endemic  
Threats: Fire, alien plant infestation  
Distribution: South  
*Restricted to Maunt Mulanje.*

***Phyllanthus nyikae* Radcl.-Sm.****Status:** VU D2

Endemism: Endemic

Distribution: North

*Restricted to the Nyika Plateau. Grows at altitudes of 2,030–2,340 m. Found in montane grassland and on the grassy edges of forests.*

## FABACEAE

***Aeschynomene tenuirama* Baker var. *hebecarpa* Verd.****Status:** VU D2

Endemism: Endemic

Distribution: North

*Restricted to the Nyika Plateau. Known only from the type locality. Grows at an altitude of 2,400 m. Apparently last collected in 1902.*

***Azelia quanzensis* Welw.****Status:** VU A1acd

Threats: Forestry exploitation

Distribution: South, Central, North

*Found widely in small subpopulations. This species is over-exploited as a high quality timber.*

***Crotalaria pilosiflora* Baker****Status:** VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation?

Distribution: North

*Restricted to the Nyika Plateau. Known from only three collections. Livingstonia is known to be on area where there is much habitat degradation.*

***Dalbergia melanaxylan* Guill. & Perr.****Status:** VU A1acdB1B2abce

Threats: Forestry exploitation, fire, browsing

Distribution: South, Central?

*Found in dry woodland. However, because of over-harvesting, many individuals are developing a shrubby character. Widespread in southern and eastern Africa. Highly sought after by the wood carving industry.*

***Humularia descampsi* (De Wild. & T.Durand)****Duvign. var. *nyassica* Duvign.****Status:** VU B1B2bc

Endemism: Endemic?

Threats: Fire, agriculture

Distribution: Central, North

*Possibly restricted to Malawi.*

***Indigofera hilaris* Eckl. & Zeyh. var. *micrascypha* (Baker) J.B.Gillett***Indigofera nyikense* Baker**Status:** VU D2

Endemism: Endemic?

Distribution: North

*Restricted to the Nyika Plateau. Only a single locality is known (known from two collections). No other information is available.*

***Pterocarpus angolensis* DC.****Status:** VU A1cd/A2cd

Threats: Forestry exploitation

Distribution: South, Central, North

*Found in dry woodland. It is reported that most of the big trees come from Mozambique. Widespread in southern Africa and DRC. Used as a highly sought after timber.*

## FLACOURTIACEAE

***Davyalis spinassima* Gild****Status:** EX?

Endemism: Endemic

Distribution: South

*Restricted to southern Malawi. Known from only one collection.*

***Rawsonia burtt-davyi* (Edlin) F.White****Status:** VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation, forestry exploitation

Distribution: South

*Restricted to Mount Mulanje. Felled as a timber tree.*

## GERANIACEAE

***Geranium mlanjense* J.R.Laundon****Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: South

*Restricted to Mount Mulanje.*

## GESNERIACEAE

***Streptacarpus nimbicala* Hilliard & B.L.Burt****Status:** VU D2

Endemism: Endemic

Distribution: South

*Restricted to Mount Mulanje.*

## GLEICHENIACEAE

***Gleichenia elongata* Baker****Status:** EN A2bC1C2a

Threats: Fire

Distribution: North

*Found in forest margins along streams. However, recent surveys could not find it there (probably a relict).*

*Produces underground rhizomes (forms a clonal population). Reproduction by spores takes very long; has a low spore viability.*

## HAMAMELIDACEAE

***Trichacladus goetzei* Engl.****Status:** VU B1B2bd

Distribution: North

## IRIDACEAE

***Gladiolus bellus* C.H.Wright****Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

*Restricted to Mount Mulanje.*

## LAMIACEAE

***Plectranthus crassus* N.E.Br.****Status:** CR B1B2c

Endemism: Endemic

Threats: Fire?

Distribution: South

*Restricted to Mount Mulanje.*

***Plectranthus mandalensis* Baker****Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

*Restricted to Mount Mulanje.*

***Stachys didymantha* Brenan****Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

*Restricted to Mount Mulanje.*

## LOBELIACEAE

***Cyphia brummittii* Thulin****Status:** CR B1B2c

Endemism: Endemic

Threats: Fire?

Distribution: South

*Restricted to Mount Mulanje.*

***Cyphia decara* Thulin****Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

*Restricted to Mount Mulanje.*

***Labelia blantlyrensis* E.Wimmer****Status:** VU D2

Endemism: Near-endemic

Distribution: South

## LYCOPODIACEAE

***Lycopodium phlegmaria* L.****Status:** VU A2bcdeB1B2abcede

Threats: Fire, habitat degradation, agriculture

Distribution: South

*It is epiphytic, and is extremely conspicuous. Suitable habitat left is probably 5 km of riverine habitat. The habitat has been reduced. Also known from Zimbabwe, Asia and Tropical Africa.*

## MALVACEAE

***Hibiscus burtt-davyi* Dunkley****Status:** VU B1B2c D2

Endemism: Near-endemic

Distribution: South

*Also recorded from Mozambique and Zimbabwe.*

## MELASTOMATACEAE

***Dissatis lanata* A. & R.Fern.****Status:** EN B1B2c

Endemism: Endemic

Threats: Fire

Distribution: North

*Endemic to Malawi.*

## MORACEAE

***Darstenia schleibenni* Mildbr.****Status:** VU D2

Distribution: North

*The species grows from an underground tuber reaching a height of almost 1 m. It is known from private land. Because the species may often be overlooked (it is small in size and seasonal), it could easily be a case of undercollection. Found in riverine forest.*

***Ficus tontonifolia* (Miq.) Miq. subsp. *ulugurensis* (Mildbr. & Burret) C.C.Berg***Ficus modesta* White**Status:** EN C2a D

Threats: Alien plant infestation

Distribution: Central

*Found in dry closed woodland. Recruitment occurs at remnant subpopulations; juveniles were found growing on trees. It is probable that other localities do not exist in Malawi. Essentially, the subpopulation in Malawi is an evolutionary 'dead end'. This taxon has a wide distribution range. Also recorded from Tanzania and Kenya.*

***Milicia excelsa* (Welw.) C.C.Berg****Status:** CR A1acdB1B2bce

Threats: Forestry exploitation

Distribution: South, Central, North

*This tree can grow up to 20–50 m tall. It is a tropical African genus consisting of two species. It is commonly called 'eroco timber'. It is a highly desirable, high-value timber species. Only a few remnant patches remain, and there are certainly no viable subpopulations left in Malawi. Forest timber species, known mainly from miombo. Wide African distribution.*



**Morus mesozygia** Stapf  
**Status:** EN A2cd  
Threats: Habitat degradation  
Distribution: South, Central  
*This is the only African species in the genus. It grows to a tall tree of up to 40 m. It exists in small relict patches. Its habitat is evergreen forest in a riparian habitat. No other localities are known. The species is widespread in Africa.*

ORCHIDACEAE

**Aerangis distincta** J.Stewart & la Croix  
**Status:** EN A2cd  
Endemism: Endemic  
Threats: Forestry exploitation, habitat degradation  
Distribution: South, Central, North  
*Epiphyte present in several localities throughout Malawi.*

**Aerangis splendida** J.Stewart & la Croix  
**Status:** EN A2cdB1B2bcd  
Threats: Forestry exploitation, habitat degradation  
Distribution: South  
*Epiphyte. Thyolo locality extirpated. Still safe at Mulunguzi River where it is rare.*

**Brownleea mulanjiensis** H.P.Linder  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Mount Mulanje.*

**Cynorkis anacamptoides** Kraenzl. var. *ecalcarata* P.J.Cribb  
**Status:** VU D2  
Endemism: Endemic  
Distribution: North  
*Endemic to the Nyika Plateau. It is associated with perennial dombos. The species was lost collected more than 30 years ago and is said to be an abnormal form.*

**Cynorkis brevicealcar** P.J.Cribb  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Restricted to Mount Mulanje. Said to have a narrow distribution.*

**Habenaria livingstoniana** la Croix & P.J.Cribb  
**Status:** CR B1B2cdD2  
Endemism: Endemic  
Threats: Agriculture, habitat degradation  
Distribution: North  
*Restricted to the Nyika Plateau. Known only from the type locality (two collections).*

**Habenaria petraea** Renz & Grosvenor  
**Status:** VU D2  
Endemism: Near-endemic  
Distribution: North  
*Appears to be widely distributed. It is found in grasslands which interface with Brachystegia woodland. It is known from a number of localities.*

**Habenaria pubidens** P.J.Cribb  
**Status:** VU D2  
Endemism: Near-endemic  
Distribution: North  
*The species forms colonies. It has a patchy distribution.*

**Habenaria riparia** Renz & Grosvenor  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: North  
*Known only from the Nyika Plateau. Several collections from the type locality. Possibly affected by tourist or visitor impacts.*

**Polystachya johnstonii** Rolfe  
**Status:** VU B1B2cdD2  
Endemism: Endemic

Threats: Fire  
Distribution: South  
*Possibly restricted to Mount Mulanje. Found on moist hills and mountains to the south of Zombo, but grows on Xerophyta, which is cut for pot scourers even in protected areas. Polystachya johnstonii Rolfe var. johnstonii la Croix & P.J.Cribb is sometimes used as a synonym. The other variety of this species, P. johnstonii var. roseopurpurea, is also at risk, but there is no information available for this variety.*

**Polystachya kaluluensis** P.J.Cribb & la Croix  
**Status:** EX?  
Endemism: Endemic  
Threats: Deforestation, agriculture, habitat degradation  
Distribution: South  
*This species may already be extinct since virtually all the trees from its forest habitat have been felled and much of the land is under agriculture.*

**Polystachya minima** Rendle  
**Status:** EN A2cd  
Endemism: Endemic  
Threats: Deforestation, urban expansion, habitat degradation  
Distribution: South  
*Endemic to southern Malawi. Known only from woodland within an area about 40 km south of Blantyre. This species used to be very common where it grew.*

**Polystachya mzuzuensis** P.J.Cribb & la Croix  
**Status:** VU A2c  
Threats: Urban expansion, deforestation?  
Distribution: North  
*Known only from two or three sites near Mzuzu in woodland.*

**Polystachya purpleobracteata** P.J.Cribb & la Croix  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Fire  
Distribution: South  
*Known only from Mount Mulanje. This is a tiny plant and is probably overlooked.*

**Satyrium afromontanum** la Croix & P.J.Cribb  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Known only from Mount Mulanje.*

**Stolzia compacta** P.J.Cribb subsp. *compacta*  
**Status:** CR B1B2c  
Endemism: Endemic  
Distribution: North  
*Known only from the Nyika Plateau. Locally widespread. Known only from the type collection. Last collected in 1968?*

**Stolzia nyassana** Schltr.  
**Status:** EN B1B2c  
Distribution: North  
*Known only from a few tree habitats.*

**Taeniophyllum coxii** (Summerh.) Summerh.  
**Status:** EX?  
Threats: Deforestation, urban expansion  
Distribution: North  
*Known only from one small site which has probably been decimated due to tree felling. Also present but rare in Ghona, DRC and Tanzania.*

**Tridactyle citrina** P.J.Cribb  
**Status:** VU B1B2D  
Threats: Deforestation  
Distribution: North  
*Known only from a few woodland areas. At risk due to tree felling. Also known from a few areas in Zambia and Tanzania.*

**Zeuxine ballii** P.J.Cribb  
**Status:** VU B1B2D2  
Threats: Habitat degradation, deforestation  
Distribution: North  
*Known only from one locality. The habitat is threatened. Widely distributed outside Malawi.*

POACEAE

**Alloochaeta oreogena** Launert  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Known only from Mount Mulanje.*

**Eragrostis sylviae** Cope  
**Status:** VU D2  
Endemism: Endemic  
Distribution: South  
*Known only from Mount Mulanje.*

PROTEACEAE

**Protea caffra** Meisn. subsp. *nyasae* (Rendle) Chisumpa & Brummitt  
**Status:** VU B1B2cdD2  
Endemism: Endemic  
Threats: Fire  
Distribution: South  
*Restricted to Mount Mulanje.*

PTERIDACEAE

**Adiantum confine** Fee  
**Status:** VU A2c  
Threats: Agriculture, habitat degradation  
Distribution: South  
*This is the only Flora zambesiaca record for this species. There is widespread habitat destruction affecting this species. Wide African distribution, including the Comores.*

**Adiantum reniforme** L.  
**Status:** VU D1D2  
Distribution: North  
*Four localities in Africa. Collected along half a kilometre of river frontage. The species needs shade on humid ledges. It is not widespread in Africa (recorded from Kenya, Senegal, Gambia, Reunion, Canary Islands, and so forth) as subpopulations are isolated.*

**Pellaea angulosa** (Bory de Saint-Vincent) Baker  
**Status:** VU A2bcdB1B2abcde  
Distribution: South  
*Also recorded in Reunion, Mascarenes, Mozambique, Zimbabwe, Tanzania and so forth.*

RESTIONACEAE

**Restio milanjanus** H.P.Linder  
**Status:** VU B1B2cdD2  
Endemism: Endemic  
Threats: Fire  
Distribution: South  
*Restricted to Mount Mulanje.*

ROSACEAE

**Prunus africana** (Hook.f.) Kalkm.  
**Status:** VU A1cd  
Threats: Harvesting  
Distribution: South, Central, North  
*Found in dry woodland. Found at higher elevations in small fragmented subpopulations. Known from Angola, Mozambique, Zimbabwe, Zambia, Central Africa, East Africa, DRC and so forth. Used for medicinal purposes.*

## RUBIACEAE

*Burttidavya nyasica* Hoyle

Status: EN B1B2bce

Threats: Forestry exploitation, habitat degradation

Distribution: South

In Malawi it has always been known from only one locality. Also recorded from Tanzania and Mozambique.

*Coffea mufindiensis* Hutch. ex Bridson subsp.

*lundaziensis* Bridson

Status: VU D1D2

Distribution: South, North

This is an afroamantane species recorded at an altitude of 2,000 m. Also known from the Zombio-Nyika Plateau.

*Morinda asteroscepa* K.Schum.

Status: VU B1B2bD2

Endemism: Near-endemic

Distribution: Central, North

Found in moist forests.

*Pavetta comostyla* S.Moore subsp. *nyassica*

(Bremek.) Bridson

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest.

*Pavetta kimbilensis* Bremek. var. *iringensis*

(Bremek.) Bridson

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest.

*Pavetta subumbellata* Bremek. var. *subcoriacea*

Bridson

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest.

*Pyrostria chapmanii* Bridson subsp. *chapmanii*

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: South

Known only from Mount Mulanje.

*Rytigynia adenodonta* (K.Schum.) Robyns var.

*adenodonta*

Status: VU D2

Distribution: North

Found in montane forests. Taxonomy is dubious. Also recorded from Zambia and Tanzania.

*Rytigynia adenodonta* (K.Schum.) Robyns var.

*reticulata* (Robyns) Verdc.

Status: VU B1B2bC2a

Distribution: South, Central, North

Found in moist forests. More than 1,000 individuals per subpopulation. The species appears to be common as indicated by the number of herbarium collections. Also known from Mozambique, Zombio, Tanzania and possibly Zimbabwe.

*Rytigynia bugoyensis* (K.Krause) Verdc. subsp.

*glabriflora* Verdc.

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest. It is very restricted although it is known from several collections from different localities.

*Rytigynia pawekiae* Verdc.

Status: VU D2

Endemism: Endemic

Threats: Fire, habitat degradation

Distribution: North

Known only from the type collection in submontane grassland.

*Sericanthe odoratissima* (K.Krause) Robbrecht var.

*ulugurensis* Robbrecht

Status: VU B1B2b

Distribution: North

Found in montane forest. The taxonomic status of this species may change.

*Tricalysia coriacea* (Benth.) Hiern subsp.

*angustifolia* (Garcia) Robbrecht

Status: VU D2

Distribution: South

Found in montane forest. Known from the country border. This variety is uncommon in Malawi. Also known from Mozambique, Zimbabwe and Zambia.

## RUTACEAE

*Vepris elegantissima* F.White & Pannell

Status: CR B1B2c

Endemism: Endemic

Threats: Habitat degradation

Distribution: South

Restricted to Mount Mulanje.

*Zanthoxylum deremense* (Engl.) Kokwaro

Status: VU B1B2b

Distribution: North

Found in montane forest. It is very restricted, although found elsewhere.

## SAPINDACEAE

*Deinbollia nyasica* Exell

Status: EX?

Endemism: Endemic

Threats: Habitat degradation, urban expansion

Distribution: South

Found in moist forest.

## STERCULIACEAE

*Cola mossambicensis* Wild

Status: VU B1B2c

Distribution: South

Found in lowland forest. Recorded from Mozambique and Zimbabwe.

## THEACEAE

*Ternstroemia polypetala* Melch.

Status: VU B1B2d

Distribution: North

Found in forests. Also recorded from as far afield as Cameroon. Also known from Tanzania.

## VELLOZIACEAE

*Xerophyta splendens* (Rendle) N.L.Menezes

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

## ZAMIACEAE

*Encephalartos gratus* Prain

Status: CR B1B2cC2b

Threats: Fire, browsing

Distribution: South

Found in forest margins. Affected by the activities of blue monkeys.

*Encephalartos* sp. Greenway 6283

Status: EX?

Endemism: Endemic

Distribution: South

Collected in miamba woodland in the vicinity of Blantyre. Known only from a single herbarium collection (in PRE). This collection represents a 'good' species. Collected in 1941. The entire vicinity of Blantyre has undergone extensive land and urban transformation, and it is almost certain that the species no longer exists.



Mulanje cedar forest in the upper Likabula Valley. (Photo: J. Burrows)



# LOWER RISK

## ALOACEAE

*Aloe duckeri* Christian

Status: LR-lc

Distribution: South, Central, North

The species is common and widespread, and in abundance.

*Aloe zebrina* Baker

Status: LR-lc

Threats: Fire

Distribution: South, Central

## ANACARDIACEAE

*Ozoroa reticulata* (Bakerf.) R. & A.Fern. var. *nyasica* R. & A.Fern.

Status: LR-lc

Distribution: South

Known from both miamba and mapane woodlands. It is extremely widespread.

*Rhus acuminatissima* R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

## ANTHERICACEAE

*Chlorophytum nyasae* (Rendle) Kativu

Status: LR-lc

Distribution: South, North

Alternative genus name is Anthericum.

## ASCLEPIADACEAE

*Ceropegia paricyma* N.E.Br.

Status: LR-nt

Distribution: South, Central, North

Widespread throughout Malawi, but with a naturally scattered distribution. Also recorded from Mozambique, Zimbabwe, Zambia, Tanzania, Caprivi area and other areas.

## ASPLENIACEAE

*Asplenium smedsii* Pichi Serm.

Status: LR-lc

Endemism: Endemic?

Distribution: North

Known only from the Nyika Plateau from a single, deep, very inaccessible forest (2,200 m). However, it may possibly occur in the Zambia-Nyika.

*Asplenium torrei* Schelpe

Status: LR-nt

Threats: Habitat degradation, deforestation

Distribution: South

Collected at 1,410 m. Known only from Malawi, Mozambique and Zimbabwe.

*Asplenium unilaterale* Lam.

Status: LR-nt

Distribution: South, Central

Only three localities in the Flora zambesiaca region, two of which are in Malawi. Recorded in Zimbabwe, Madagascar, Mauritius, Mascarenes and widespread in Tropical Africa.

## ASTERACEAE

*Brachythrix malawiensis* (Wild & G.V.Pope)

G.V.Pope

*Brachythrix brevippappa* subsp. *malawiensis* Wild & G.V.Pope

Status: LR-lc

Endemism: Endemic

Distribution: North

Grows in submontane grassland and woodland at an altitude of 2,133 m. Known from only two collections from two localities; endemic to the Nyika Plateau.

*Helichrysum syncephalum* Baker

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

## BALSAMINACEAE

*Impatiens schulziana* Launert

Status: LR-lc

Endemism: Endemic

Distribution: South, North

On borders of montane forest. It is associated with waterfalls (2,200–2,600 m). It is apparently widely distributed in the Nyika National Park. The taxonomy of this species is also very uncertain. Widely differing accounts state that it is either confined to the Nyika Plateau or that it is also found on Mount Mulanje.

## BLECHNACEAE

*Blechnum ivohibense* C.Chr.

Status: LR-lc

Distribution: South

Wide distribution also recorded from Mozambique, Zimbabwe, Madagascar, Kenya, Tanzania and others.

## CELASTRACEAE

*Maytenus acuminata* (L.f.) Loes. var. *uva-ursi*

Brenan

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

## COMBRETACEAE

*Pteleopsis myrtifolia* (Laws.) Engl. & Diels

Status: LR-lc

Threats: Harvesting

Distribution: South, Central, North

Occurs in miamba. It is harvested for fuelwood and the timber is used for poles.

## CYPERACEAE

*Carex brassii* Nelmes

Status: LR-lc

Endemism: Endemic?

Distribution: South, North

A single specimen from Rumphi District (Pawek 13856) appears to be *C. brassii*, but the material is poor. Recently collected on the Nyika Plateau. Possibly found in Tanzania.

## ERICACEAE

*Erica milaniana* Bolus

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

## EUPHORBIACEAE

*Croton megalobotrys* Mull.Arg.

Status: LR-lc

Distribution: South

Common in large numbers along streams and rivers.

*Erythrococca trichogyne* (Mull.Arg.) Prain var. *psilogyne* Radcl.-Sm.

Status: LR-lc

Endemism: Near-endemic

Distribution: North

The species appears to be extremely widespread. There is another unspecified locality on the Malawi-Nyika.

*Euphorbia whyteana* Baker f.

Status: LR-nt

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje. Represented by many herbarium specimens, indicating a level of abundance.

## FABACEAE

*Tephrosia whyteana* Baker subsp. *whyteana*

Status: LR-nt

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

## GESNERIACEAE

*Streptocarpus dolichanthos* Hilliard & B.L.Burt

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

*Streptocarpus hirtinervis* C.B.Clarke

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

*Streptocarpus leptopus* Hilliard & B.L.Burt

Status: LR-nt

Endemism: Near-endemic

Distribution: South

*Streptocarpus milanjanus* Hilliard & B.L.Burt

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

## GRAMMITIDACEAE

*Lellingeria oosora* (Baker) A.R.Sm. & R.C.Moran

Status: LR-lc

Distribution: South

Very small and probably overlooked. Found at high altitudes (about 2,000 m). Known from Zambia and Tropical Africa.

## LAMIACEAE

*Plectranthus acaulis* Brummitt & Seyani

Status: LR-lc

Endemism: Near-endemic

Threats: Habitat degradation?

Distribution: North

Known from only a single locality in Zambia (Nyika Plateau). Initially considered to be categorised as Vulnerable based on the number of herbarium specimens. However, the species is probably continuously distributed.

*Plectranthus zebraurum* Brummitt & Seyani

Status: LR-lc

Endemism: Endemic

Distribution: North

Possibly endemic to the Nyika Plateau. The species appears to be common on the Nyika Plateau and it possibly extends into Zambia.

## LOMARIOPSIDACEAE

*Elaphoglossum mildbraedii* Hieron.

Status: LR-nt

Distribution: South

1,765–2,075 m altitude. Probably very easily overlooked. Also known from East Africa.

## MELASTOMATACEAE

*Dissotis johnstoniana* Baker f. var. *strigosa* Brenan

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

## MYRSINACEAE

*Anagallis oligantha* P.Taylor

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

## OPHIOGLOSSACEAE

*Ophioglossum thomasi* Clausen

Status: LR-lc

Distribution: South, North

Small species and often overlooked. Known mainly from dambas at an altitude greater than 2,000 m. Vast habitat of this species on the Nyika Plateau. Extremely widespread. Known only from two localities in Malawi. Known also from Tanzania, Kenya and possibly occurs elsewhere.

## ORCHIDACEAE

*Cynorkis buchananii* Rolfe

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to southern Malawi. Several sites on Zomba Plateau and Mount Mulanje.

*Habenaria nyikense* G.Will.

Status: LR-nt

Endemism: Endemic

Distribution: North

Known as an endemic of the northern plateaux of Malawi. The species has a wide altitudinal range of almost 600 m.

*Herschelianthe praecox* (H.P.Linder) H.P.Linder

Status: LR-lc

Endemism: Endemic

Distribution: North

Known only from the Nyika Plateau. It grows in short well drained grassland above 2,000 m.

*Polystachya songaniensis* G.Will.

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation, deforestation?

Distribution: South

Known from only a few localities on mountains in the Southern Province. Found on racks and remains of sedge plants, so not at risk of tree felling or cultivation. Common on Mount Zomba.

## OXALIDACEAE

*Oxalis chapmaniae* Exell

Status: LR-lc

Endemism: Endemic

Distribution: North

Known only from the Nyika Plateau. Grows at an altitude of 2,130–2,440 m in submontane grassland. This species is fairly common on the Nyika Plateau.

## POACEAE

*Alloeochoete geniculata* Kabuye

Status: LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

*Alloeochoete gracillima* Kabuye

Status: LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

*Digitaria trinervis* Van der Veken

Status: LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

*Eragrostis fastigiata* Cope

Status: LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

*Panicum nymphoides* Renvoize

Status: LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

*Setaria grandis* Stapf

Status: LR-lc

Endemism: Endemic

Distribution: North

Known only from the Nyika Plateau. This species is locally abundant in that it has a very restricted distribution but occurs in extremely high numbers, almost to the point of being weedy.

## POLYGALACEAE

*Polygala nyikensis* Exell

Status: LR-lc

Endemism: Near-endemic

Distribution: North

This species has been collected from several unspecified localities. Grows in submontane grassland up to 2,300 m. Early herbarium collections represent individuals older than a year, attributed to the effect of fire.

## PROTEACEAE

*Protea caffra* Meisn. subsp. *mafinensis* Chisumpa & Brummitt

Status: LR-lc

Endemism: Endemic

Distribution: North

Endemic to Malawi. This species appears to be common on the Nyika Plateau.

## PTERIDACEAE

*Coniogramme africana* Hieron.

Status: LR-lc

Distribution: North

Found in deep forests. It is rare wherever it occurs. Also known from East Africa.

## RUBIACEAE

*Ixora scheffleri* K.Schum. & K.Krause subsp. *scheffleri*

Status: LR-nt

Endemism: Near-endemic?

Threats: Harvesting

Distribution: South, Central, North

Found in submontane forest where it is extremely widespread. Also recorded from Tanzania and Mozambique. Often used as a fuelwood.

*Psychotria zombamontana* (Kuntze) Petit

Status: LR-nt

Threats: Harvesting

Distribution: South, Central

Found in montane forests where it is widely distributed. Widely distributed outside Malawi. Reported to be very common. Often used as a fuelwood.

## SCROPHULARIACEAE

*Buchnera crassifolia* Engl.

Status: LR-lc

Endemism: Endemic

Distribution: North

It is known only from submontane grasslands up to 2,400 m. The holotype was destroyed in Berlin.

*Selago blantyreensis* Rolfe

Status: LR-lc

Endemism: Endemic

Distribution: South

Confined to southern Malawi. Found amongst rocks in open grassland and woodland. Found along roadsides and firebreaks.

*Selago thyrsoidea* Baker var. *thyrsoidea*

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation

Distribution: North

Known only from the Nyika Plateau. Possibly affected by taurist or visitor impacts.



*Disa zombica*, a species possibly used for chikanda.

(Photo: G. Williamson)



## ASPLENIACEAE

*Asplenium uhlighii* Hieron.

Status: DD

Initially thought to be a depauperate form of *A. aethiopicum*. Associated with mountain peaks.

## ASTERACEAE

*Helichrysum patulifolium* Baker

*Helichrysum flammeiceps* Brenan

Status: DD

Endemism: Endemic?

Threats: Fire

Distribution: North

Possibly endemic to Malawi. Grows in *Brachystegia* woodland.

*Senecia auriculatissima* Britten

Status: DD

Endemism: Near-endemic

Threats: Fire

Distribution: South

The identity of this species may be questionable.

*Senecia milanjanus* S.Moore

Status: DD

Endemism: Near-endemic

Distribution: South

The identity of this species may be questionable.

## CYPERACEAE

*Alinula malawica* (J.Raynal) Goetgh. & Vorster

Status: DD

Endemism: Near-endemic

Distribution: South

Known only from one record in Malawi, and from one other record in Zambia.

*Fuirena nyasensis* Nelmes

Status: DD

Endemism: Endemic

Distribution: South, Central, North

Restricted to Malawi.

*Pycnus acaulis* Nelmes

Status: DD

Endemism: Endemic

Distribution: South, Central, North

Restricted to Nyika Plateau.

## EUPHORBIACEAE

*Euphorbia ampliphylla* Pax

Status: DD

Threats: Deforestation

Distribution: North

Known from Nyika Plateau and Matipa Forest. Recorded from Tanzania, Uganda, Kenya, Ethiopia and sa farth. Also referred to as *E. obovalifolia*.

*Euphorbia isacantha* Pax

Status: DD

Distribution: North

Known only from Karanga District. It is believed to be rare in Malawi based on the low numbers of herbarium specimens.

*Euphorbia richardsiae* L.C.Leach subsp. *robusta* L.C.Leach

Status: DD

Endemism: Endemic

Distribution: North

Restricted to Malawi. It is believed to be rare based on the low number of herbarium specimens. Herbarium specimens of both subspecies (*S. richardsiae* subsp. *richardsiae* and *S. richardsiae* subsp. *robusta*) are mainly from Mzimba on granite outcrops.

*Manadenium parviflorum* N.E.Br.

Status: DD

Distribution: South, Central, North

Restricted mainly to the Nyika Plateau, although it is widespread throughout Malawi. Also known from Tanzania and Zambia. A common synonym for this species is *M. depauperatum*.

## FABACEAE

*Latus mlanjeanus* J.B.Gillett

Status: DD

Endemism: Endemic?

Distribution: South, Central, North

Possibly restricted to Malawi.

*Rhynchosia clivarum* S.Moore var. *fulvida* Meikle

Status: DD

Endemism: Endemic?

Distribution: South, Central, North

Possibly restricted to Malawi.

## FLACOURTIACEAE

*Rawsonia reticulata* Gilg

Status: DD

Distribution: North

Unspecified locality around 'Lake Nyasa' from an early herbarium specimen.

## ILLECEBRACEAE

*Corrigiola drymarioides* Baker f.

Status: DD

Endemism: Near-endemic

Distribution: South

## LAMIACEAE

*Plectranthus dissectus* Brenan

Status: DD

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

*Plectranthus elegans* Britten

Status: DD

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

*Plectranthus malawiensis* Mathew

Status: DD

Endemism: Endemic

Distribution: North

Known from only two localities.

*Plectranthus zombensis* Baker

Status: DD

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

## LOMARIOPSIDACEAE

*Elaphoglossum deckenii* (Kuhn) C.Ch.

Status: DD

Distribution: South

Rarest species of the genus. Found in wet forests. There may be more localities. Also known from East Africa.

*Lamariopsis warneckeii* (Hieron.) Alston

Status: DD

Threats: Fire, habitat degradation

Distribution: South, North

Very rare, never widespread. Widely creeping rhizome. Also known from Mozambique, Zimbabwe, Tanzania, Cameroon and sa farth.

## LYTHRACEAE

*Rotala juniperina* Fern.

Status: DD

Endemism: Endemic?

Distribution: South

Possibly restricted to Mount Mulanje.

## MELASTOMATACEAE

*Dissotis johnstoniana* Baker f. subsp. *johnstoniana*

Status: DD

Endemism: Near-endemic

Distribution: South

## MORACEAE

*Ficus scassellatii* Pamp.

Status: DD

Threats: Habitat destruction, forestry exploitation

Distribution: South, Central, North

This species grows in mid-altitude semi-evergreen forest (1,900–1,950 m). It is a tall strangler fig, recorded as growing to heights of 50 m. Also recorded from Tanzania, Kenya, Uganda and DRC.

## ORCHIDACEAE

*Anagraecum stella-africae* P.J.Cribb

Status: DD

Threats: Forestry exploitation, habitat degradation

Distribution: South, North

Level of endemism uncertain. Two known sites in the north and a single collection in the south.

*Balusiella maudiae* (Bolos) Schltr.

Status: DD

Threats: Forestry exploitation, habitat degradation

Distribution: South

Widespread in woodland and widely represented outside Malawi.

*Cardiochilus williamsonii* P.J.Cribb

Status: DD

Endemism: Near-endemic

Distribution: North

Known only from a single area on Nyika Plateau.

*Cynarkis symaensis* Geernick & Tournay

Status: DD

Distribution: North

Known from a small area. Also recorded from Tanzania and Rwanda.

*Disa fragrans* Schltr. subsp. *fragrans*

Status: DD

Distribution: South

Known from several countries. Collected only once or twice in Malawi.

*Disa nyikensis* H.P.Linder

Status: DD

Distribution: North

Also recorded from Zombio and Tonzonio.

*Disperis breviloba* Verdc.

Status: DD

Distribution: North

Collected only once on Nyiko Plateau.

*Eggelingia clavata* Summerh.

Status: DD

Distribution: South

Hos o wide African distribution, especially West Africa.

*Eulophia monticola* Rolfe

Status: DD

Endemism: Near-endemic

Distribution: South

Toxonomically difficult to separate *Eulophia monticola* from *E. inyangensis* Summerh. Previously, *E. monticola* had been considered endemic to Mount Mulanje.

*Habenaria disselloides* Schltr.

Status: DD

Endemism: Near-endemic

Distribution: North

Known from only a few localities on the Nyiko Plateau.

*Habenaria hirsutitrunci* G.Will.

Status: DD

Endemism: Near-endemic

Distribution: North

Also found on Zombio-Nyiko. Occurs in several scattered sites on Malawi-Nyiko. Possibly known from other sites further afield.

*Habenaria pubipetala* Summerh.

Status: DD

Endemism: Endemic

Threats: Forestry exploitation, agriculture

Distribution: South, Central, North?

Endemic to Malawi. Only one old record from the North, most of the localities are from southern and central Malawi. All the localities are threatened.

*Microcoelia corallina* Summerh.

Status: DD

Distribution: South, North?

Known only from the southern part of Malawi. Possibly occurs in northern Malawi. Also known from Kenya and Tanzania.

*Microcoelia megalorrhiza* (Rchb.f.) Summerh.

Status: DD

Threats: Habitat degradation

Distribution: South

Known only from two localities in the South. It is reported that the species is poorly protected. This species is known to be rare.

*Microcoelia ornithocephala* P.J.Cribb

Status: DD

Endemism: Endemic

Threats: Habitat degradation

Distribution: South

Restricted to Malawi. Known only from two localities in the South.

*Oberonia disticha* Lindl.

Status: DD

Distribution: South

Known only from two sites in Southern Province (and only collected once at one of these) but fairly widespread elsewhere in Africa.

*Platylepis glandulosa* (Lindl) Rchb.f

Status: DD

Distribution: South, North

Known only from two small areas in Malawi but widespread elsewhere in Africa.

*Polystachya calluniflora* Kraenzl. var. *hologlossa* P.J.Cribb & la Croix

Status: DD

Distribution: North

Found in small areas at risk of tree felling.

*Polystachya goetzeana* Kraenzl.

Status: DD

Occasional in forest patches.

*Polystachya holmesiana* P.J.Cribb

Status: DD

Threats: Deforestation, habitat degradation

Distribution: North

Found inside a small area within Nyiko National Park, as well as at a locality on the Park's periphery which is under much threat from tree felling.

*Polystachya lawrenceana* Kraenzl.

Status: DD

Endemism: Endemic

Distribution: South

Endemic to Malawi. Grows on rocks so not at risk from tree felling.

*Polystachya mafingensis* P.J.Cribb

Status: DD

Endemism: Near-endemic

Threats: Deforestation

Distribution: North

Restricted to the Mofingo Mountain.

*Satyrium ecalcaratum* Schltr.

Status: DD

Distribution: South

In Malawi it is known only from a few herbarium collections. Known from other African countries.

*Solenangis conica* (Schltr.) L.Jonsson

Status: DD

Distribution: Central

Known only from a small locality. Also in Mozambique, Zimbabwe and Tanzania.

*Stolzia williamsonii* P.J.Cribb

Status: DD

Distribution: North

Associated with forests of Nyiko Plateau.

*Tridactyle verrucosa* P.J.Cribb

Status: DD

Distribution: South

Epiphytic on rocks and windswept trees.

*Tridactyle virginea* P.J.Cribb & la Croix

Status: DD

Distribution: North

## POLYPODIACEAE

*Platyserium elephantotis* Schweinf.

Status: DD

Widespread throughout Africa in countries such as Sudan, Mozambique, and Zombio.

## PROTEACEAE

*Faurea racemosa* Farmar

Status: DD

Endemism: Near-endemic

Distribution: South

## PTERIDACEAE

*Anogramma leptophylla* (L.) Link

Status: DD

Distribution: North

There is only one known recent collection in Malawi; the species is probably extremely widespread. It should probably be removed from the RDL.

## RUBIACEAE

*Coffea mufindiensis* Hutch. ex Bridson subsp. *australis* Bridson

Status: DD

Distribution: South, Central, North

The species appears to be extremely common as there are many collections for it. No other information is available. Also recorded from Mozambique and Zimbabwe.

*Coffea* sp. Brummitt 8936

Status: DD

Endemism: Endemic

Distribution: South

Grows in thicket. Known only from the type locality. Type specimen collected in 1970.

*Oxyanthus goetzei* K.Schum. var. *A* Bridson

Status: DD

Endemism: Endemic

Distribution: South, Central

Restricted to Malawi. Known from a number of specimens (Bridson 662 (K; MAL) 1991; Potel & Towokoli 999 (K; MAL) 1982). In undergrowth of evergreen montane forest, with *Newtonia*, *Garcinia*, etc. or in submontane forest at altitude 1,400–1,500 m.

## SANTALACEAE

*Thesium whyteanum* Rendle

Status: DD

Endemism: Near-endemic

Distribution: South

## SAPOTACEAE

*Synsepalum muelleri* (Kupicha) T.D.Penn.

Status: DD

Endemism: Near-endemic

Distribution: South

## SCROPHULARIACEAE

*Selago whyteana* Rolfe

Status: DD

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje. Known only from the western side of the massif. Most specimens of this species are from roadsides and other bare areas. Often bauxite is mentioned as a substrate.

## THYMELAEACEAE

*Gnidia chapmanii* Peterson

Status: DD

Endemism: Near-endemic

Distribution: South

## VITTARIACEAE

*Antrophyum mannianum* Hook.

Status: DD

Distribution: South

There are only two records for it in the Flora zambesiaca area. It was recently collected on Mount Mulanje.

## XYRIDACEAE

*Xyris makuensis* N.E.Br.

Status: DD

Endemism: Near-endemic

Distribution: South

Also known from Mozambique and possibly occurs in Tanzania.



# Mozambique



Samira Izidine\* & Salomão O. Bandeira†

## Introduction

Mozambique is located on the southeast coast of southern Africa (between 10°27'S and 26°52'S, and 30°52'E, 30°12'E and 41°51'E). The country occupies an area of approximately 800,000 km<sup>2</sup>. It shares common borders with Tanzania in the north, Malawi, Zambia, and Zimbabwe in the west, and South Africa in the south. The Indian Ocean coastline of Mozambique is over 2,700 km in length.

The flora of Mozambique is characterised by miombo and mopane woodlands, grasslands, mangroves, and coastal mosaics (Wild & Barbosa 1967, White 1983). With 5,692 species of higher plants currently recorded for Mozambique, it is believed that some of these species are under pressure from human activity and natural causes. At total of 2,676 km<sup>2</sup> lies within protected areas, representing 11% of the country (Bandeira *et al.* 1994).

Two main centres of endemism occur in Mozambique: Maputaland in the south—which includes areas in South Africa and Swaziland—and Chimanimani that is shared between Zimbabwe and central Mozambique (Hatton & Mungambe 1998). Consequently, some plant species that occur in these centres of endemism and are listed as endemic, could well be near-endemic (and vice versa). Endemic

species whose distribution ranges are dubious include *Hexalobus mossambicensis* and *Xylopia torreii*; examples of those sceptically considered near-endemic include *Pseudosbeckia swynnertonii* and *Anthospermum ammannioides*. Most of the botanical inventories undertaken in Mozambique have been conducted mainly in the south of the country; the centre and north have been less well documented.

High population densities in towns, however, in conjunction with poverty-stricken conditions, stimulate forest and savanna depletion for fuelwood requirements; this has been the major cause of forest and savanna degradation in Mozambique. Deforestation rates reach up to 147,077 ha per year. Mangroves, one of main vegetation types in coastal Mozambique, are being subjected to deforestation at a rate of 1,821 ha per year (Barbosa *et al.* 2001); mangrove degradation is particularly high in the rapidly expanding cities of Maputo and Beira. Other causes for the loss of species are traditional agricultural practices, monoculture systems, and unsustainable development.

A Red Data List for Mozambique is therefore a necessity to identify species at risk of extinction, and can assist in defining priorities, strategies, and actions towards their conservation.

**Table 1. Number of taxa in each RDL category in Mozambique.**

RDL status	Number of taxa
Extinct (EX)	1
Critically Endangered (CR)	6
Endangered (EN)	6
Vulnerable (VU)	109
Lower-Risk near threatened (LR-nt)	16
Lower-Risk least concern (LR-lc)	23
Data Deficient (DD)	139
<b>Total</b>	<b>300</b>

\*National Institute of Agronomic Research, LMA Herbarium, Maputo, Mozambique

†Eduardo Mondlane University, Botany Department, LMU Herbarium, Maputo, Mozambique

**Capital:** Maputo, largest city and port

**Area:** 801,590 km<sup>2</sup>

**Languages:** Portuguese (official), Macua, Ndau, Tsonga, Maconde, Swahili

**Currency:** Meticaís (MT)

**Total plant species:** 5,692

**Total plant endemics:** 177

**Total RDL plants:** 300

**Focal RDL institutions:** LMA, LMU

**Number of Protected Areas:** four National Parks, five Game Reserves, 13 Coutadas ("Official Hunting Areas"), one Transfrontier Park (Mozambique–South Africa–Zimbabwe), and several other proposed protected areas (including Transfrontier Parks)

**Population:** 17,299,000 **Growth Rate:** 1.9% **Density:** 21.2 people/km<sup>2</sup>

**Phytogeography:** Predominantly Zambezan, with Afromontane elements at higher altitudes. There is a broad belt of Zanzibar–Inhambane Regional Mosaic along the entire coastline and interior river valleys in the north except for a small area of Tonga–Pondoland Regional Mosaic in the extreme south.

**Flora:** Mainly miombo woodland, with mopane woodland in the Zambezi and Limpopo Valleys. Montane forests and grasslands found at higher elevations. Mosaic of coastal woodlands, as well as forest/mangrove patches.

**Sources:** Anonymous 2000, Bandeira, Hatton, Munisse & Izidine 1994, Stuart & Adams 1990, White 1983

**Table 2. Families containing the highest numbers of RDL species.**

Family	Number of species
Rubiaceae	26
Fabaceae	20
Euphorbiaceae	15
Zamiaceae	13

**Table 3. Endemism on the RDL for Mozambique.**

Endemism	Number of taxa
Confirmed endemic	166
Suspected endemic	11
Confirmed near-endemic	60
Suspected near-endemic	17
<b>Total</b>	<b>254</b>

## Methods

### Information Synthesis

During the first phase of RDL compilation, information regarding threatened plant species or those potentially at risk of extinction was synthesised. Data were gleaned from lists by Bandeira *et al.* (1994), Van Wyk (1996), Hatton & Munguambe (1998), Oldfield *et al.* (1998), and Walter & Gillett (1998). These lists tended to concentrate on endemic, medicinal, and woody species.

After the compilation of the draft list, a Red Data List workshop was held in Maputo from 23 to 27 October 2000. Participants were trained in the use of the IUCN criteria and categories (IUCN 1994). *Flora de Moçambique* and *Flora Zambeziaca* were used to refine the preliminary list of species that merited Red List status. Additional information on some of the better known plant species from southern Mozambique was obtained from field observations by botanists. Herbarium specimen information from LMA and LMU was used to identify additional species localities, but was subsequently found to be of extremely limited value. Vegetation maps were used to determine the distribution of habitats in which the Red Listed species occur and were also used to estimate threats.

We attempted to estimate distribution ranges (*Extent of Occurrence* and *Area of Occupancy*) but data were so unreliable (taxonomically), sparse, and outdated, and revealed so little about the threats in the habitats of many species, that it became extremely difficult to make assumptions and inferences.

Red List evaluations were done for species falling into the following categories:

- Species endemic or near-endemic to Mozambique
- Species restricted to small areas or limited habitats
- Utilised taxa (timber, medicinal, and ornamental purposes)
- Taxa in close proximity to high impact areas (settlement areas, agricultural and industrial developments)

### Application of the Red Data List Categories

The IUCN (1994) Red List categories and criteria were applied, based on evidence concerning numbers, trends in disappearance, and the distribution of taxa. Factors such as population pressure on a species, proximity to human settlements, and agricultural and industrial activities were taken into consideration. For example, if a species occurs near human settlements or agricultural and industrial activities, then it is more likely to be lost.

The *Vulnerable D2* category was applied judiciously in cases where species were found only in type localities, the distribution range was likely to be narrow, and if threats were known. The *Data Deficient* category was applied in cases where species were known only from the type collection or from a single locality and where no information regarding threats was available. The threatened categories (*Critically Endangered*, *Endangered* and *Vulnerable*) were applied when the risk of extinction was certain and known to be high. Only in a few exceptional cases—for example, *Raphia australis* and the 13 *Encephalartos* species recorded for Mozambique—was complete information available, that is, throughout the entire distribution range for the species concerned.

## Results and Discussion

### Red Data List

Some species found in the RDL presented here occur in previous, very prominent publications; the *World List of Threatened Trees* (Oldfield *et al.* 1998) listed 78 species and the 1997 *IUCN Red List of Threatened Plants* (Walter & Gillett 1998) listed 89 vascular plants (including trees) for Mozambique. In addition, several near-endemic species that occur in Mozambique were listed in Hilton-Taylor (1996) in the RDLs for Swaziland (Lebombo Mountains) and South Africa (Maputaland).

Some 300 species, by contrast, are listed in the list presented here. Of these, 122 are listed as *Critically Endangered* (CR), *Endangered* (EN), and *Vulnerable* (VU). Many species (139) have, however, been categorised as *Data Deficient* (DD). Virtually all of the DD species are known from only one or a few herbarium collections, with very sparse and irrelevant information on the specimen labels. Many species, moreover, are not properly identified or possess uncertain taxonomic identification.

In addition, the fact that few inventories were compiled for the interior and north of Mozambique, led to a far higher representation of southerly distributed plants on the Red Data List.

Certain plant species like *Dombeya cymosa*, *Carpodiptera africana*, *Corchorus junodii*, and *Grewia glandulosa*, which were represented in previous Red Data Lists, have been excluded from this List. This is partially because the IUCN (1994) categories take into account quantitative data and exclude these species as candidates for a Red Data List owing to their abundance in the wild.

With regard to plant families on the Red Data List, the Rubiaceae, Fabaceae (Leguminosae), and Euphorbiaceae are well-represented compared to other families (Table 2); this was an expected result, as these families are well-studied. The Orchidaceae of Mozambique, on the other hand, have been relatively poorly studied and are poorly represented because of a lack of field information. For example, *Eulophia biloba* is known only from a single specimen that was collected in 1895 near Beira, which today is a large coastal town. There are several similar examples from the Orchidaceae: *Eulophia bissacata*, *Disperis mozambicensis*, *Habenaria mossambicensis*, and *Liparis hemipiloides*. Similarly, little is understood about the Poaceae of Mozambique, as many species are known only from a specific location; this may be an artefact resulting from the general unpopularity of collecting grasses. Furthermore, many grasses particularly from the coastal areas, may have been introduced from other countries—the Mozambique coastline has hundreds of years of trade history with neighbouring countries on the African mainland and the surrounding islands.

Some 177 endemic species appear on the List (Table 3)—these endemics are found mainly in the Maputaland zone and the Chimanimanis. Some taxa have been listed as near-endemic (77 species), as they are



also found in South Africa, Swaziland, Tanzania, and Zimbabwe. It is, however, suspected that Mozambique possesses many more range-restricted species, especially in the north of the country. More inventories and field explorations are recommended in the northern countryside, as many species are likely to be shared across the Rovuma River and other political boundaries with Tanzania, presenting opportunities for collaborative field research.

### *Useful and Threatened Species*

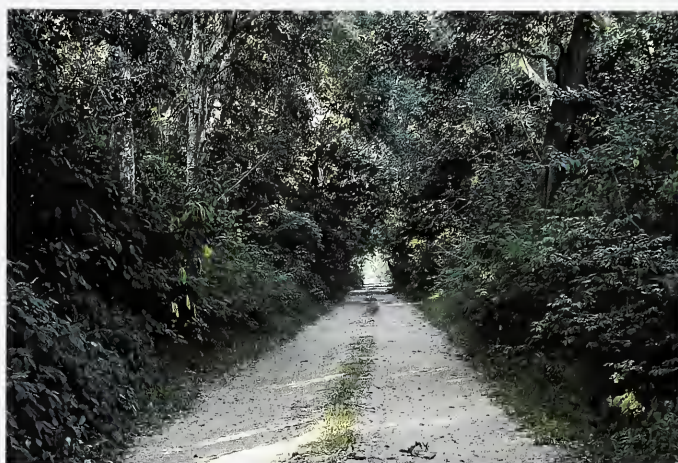
As in most other southern African countries, timber, medicinal, edible, and ornamental species are the most important groups of plant used in Mozambique. Close to 70% of the Mozambican population uses medicinal plants for basic healthcare (World Conservation Monitoring Centre 1992); urban markets in Maputo and Beira sell medicinal plants derived from many parts of the country.

In general, all utilised plants should be monitored, as they may be eligible for Red Lists, and their depletion will undoubtedly have serious socio-economic consequences. Timber species that were included in this List, such as *Milicia excelsa* (LR-nt) and *Azelia quanzensis* (LR-nt), should be monitored. Medicinal plants such as *Warburgia salutaris* (VU A2cd), used for alleviating throat complaints (Bandeira *et al.*, in press), should also be monitored. Species of *Encephalartos* are believed to be illegally exported for use as ornamental plants, mainly to neighbouring countries.

The major threats to plant species in Mozambique are related to uses of a non-sustainable nature and include:

- Heavy exploitation of natural resources for fuelwood
- Industrial development
- Traditional agricultural practices
- Human settlements and urbanisation

The most sensitive ecosystem zones include coastal areas and the areas surrounding main towns, owing to high population densities. In poverty-stricken areas, the main threat is deforestation for fuelwood and charcoal. Commercial deforestation takes place mainly in south-central Mozambique and in mangrove areas where there is a high abundance of woody tree species whereas industrial development and urbanisation are very high in Maputo and Sofala Provinces. In addition, destructive agricultural practices take place on a large scale, mainly in rural areas.



Inhamitanga Forest in pristine condition. (Photo: J. Burrows)



Inhamitanga Forest—the trail of destruction. (Photo: J. Burrows)

### **Conclusions and Recommendations**

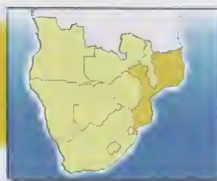
While compiling this List, several constraints were encountered: these range from a lack of information to the lack of a national checklist and incomplete and outdated information. We found that herbarium specimen information is an inadequate basis for determining Red Data List status for the plant species of Mozambique. Our knowledge of the flora of Mozambique is mostly restricted to southern Mozambique and field exploration in northern and central Mozambique is needed to update scientific information, as well as to increase the numbers of herbarium collections. Gathering information on endemics and near-endemics is especially important.

Collaboration with neighbouring countries (Malawi, South Africa, Swaziland, Tanzania, and Zimbabwe) and sharing of expertise are important elements that can assist in the compilation of botanical inventories.

These inventories will form a basis for directly assisting in national conservation planning, sustainable resource utilisation strategies, and further research priorities.

**Acknowledgements** We would like to express our sincere gratitude to the Red Data List National Working Group: Filomena Barbosa, Angelina Martins, Ana Bela Amude, Carla Ruas, Eduardo Massingue, Felisbela Gaspar, Silva Mulhovo, Köeti Seródio, Catarina Chidiamassamba, Maria da Luz Dai, and Agostinho Lisboa. Our thanks are extended to Janice Golding and Peter Phillipson who compiled and edited the Red Data List assessments. Marta Monjane and Paul Dutton, staff of Kew Herbarium (K), and anyone who directly or indirectly contributed to this work are also thanked.





Samira Izidine\* & Salomão O. Bandeira†

## Introdução

Moçambique esta localizado na costa sudoeste da África Austral (latitude entre 10°27'S–26°52'S e longitude entre 30°52'E e 30°12'E–41°51'E) e tem uma área de aproximadamente 800,000 km<sup>2</sup> de superfície. O País faz fronteira com Tanzânia ao Norte; Malawi, Zâmbia, Zimbabwe e África do Sul a Oeste e Swazilândia e África do Sul a Sul. A linha costeira (Oceano Índico) é aproximadamente de 2,700 km de comprimento.

A Flora de Moçambique e maioritariamente caracterizada por possuir matagais de Miombo e de Mopane, mosaicos costeiros, capinzais e mangais (White 1983; Wild & Barbosa 1967). Tendo cerca de 5,692 espécies de plantas superiores, acreditase que algumas dessas espécies estejam sobre pressão por causas antropogénicas e naturais. Dos cerca de 800,000 km<sup>2</sup> apenas 11%

da área é conservada correspondendo a 2,676 km<sup>2</sup> de reservas florestais (Bandeira *et al.* 1994).

Em termos de endemismo, Moçambique possui dois principais centros de endemismo, nomeadamente o centro de endemismo de Maputoland a sul do país, abrange também a África do Sul e a Swazilândia e o centro de endemismo de Chimanimani no centro de Moçambique, abrangendo também o Zimbabwe. Algumas espécies que ocorrem nessas regiões e que foram listadas como endémicas poderão por isso ser “quasi-endémicas” e não endémicas podendo o contrário ter-se igualmente verificado. As espécies cuja distribuição não é totalmente conhecida incluem: *Hexalobus mossambicensis*, *Xylopia torrei* e *Mesanthemum africanum*. As espécies *Pseudosbeckia swynnertonii* e *Anthospermum ammannioides* são quasi-endémicas e sua distribuição não é totalmente conhecida. Os inventários botânicos em Moçambique foram maioritariamente realizados no Sul, tendo o centro e norte beneficiado menos dos referidos inventários.

A grande concentração de pessoas nas cidades, associada as condições precárias na periferia dos centros urbanos, que estimula o desmatamento das florestas e savanas para suprimento do combustível lenhoso, tem sido a principal causa da contínua degradação das florestas e savanas moçambicanas. O desmatamento de vegetação pode atingir 147,077 ha por ano. Os mangais uma das principais vegetações costeiras de Moçambique é desmatado a um ritmo de 1,821 ha por ano (Barbosa *et al.* 2001). O desmatamento dos mangais é particularmente alto nas cidades de Maputo e Beira. Outras causas de perda de espécies incluem as práticas tradicionais de agricultura, cultivo em monocultura e desenvolvimento não sustentável.

A Lista Vermelha (Red Data List) para Moçambique surge assim como uma necessidade urgente de se identificar as espécies em risco de extinção e definir acções, estratégias e prioridades para a sua conservação.

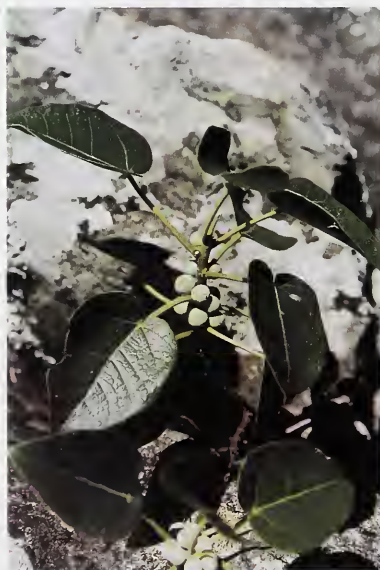
## Metodologia

### Síntese da Informação

A primeira fase de compilação da Lista Vermelha foi a sintetização de informação das plantas ameaçadas ou potencialmente ameaçadas de extinção com base nas seguintes listas: Bandeira *et al.* (1994, 1996), Van Wyk (1994), Hatton & Mungumbe (1998), Oldfield *et al.* (1998) e Walter & Gillett (1998). Estas referências debruçaram-se sobretudo sobre plantas endémicas, medicinais e espécies lenhosas.

Após esta actividade realizou-se o primeiro workshop sobre a Lista Vermelha em Maputo, de 23 a 27 de Outubro de 2000, onde os participantes para além de terem sido treinados a usar as categorias e critérios da IUCN (1994), compilaram a informação existente e determinaram o estado de conservação das diferentes espécies. Para o efeito foram utilizadas outras fontes de informação como os depoimentos de botânicos e ecologistas (*Flora de Moçambique* e *Flora Zambeziaca*). Os espécimens dos Herbários LMA e LMU foram também utilizados com o objectivo de se identificar outros locais de distribuição.

A Extensão de Ocorrência e Área de Ocupação, i.e., alcance da distribuição, foi estimada mas os resultados obtidos eram pouco fiáveis em termos taxonómicos. A dispersão da sua distribuição, a ausência de informação sobre ameaças nos habitats, onde ocorriam as espécies, tornou o exercício de se fazerem pressupostos e inferências muito difícil.



***Ficus muelleriana*, endemic to Mozambique, is known from very few localities. (Photo: J. Burrows)**

\*Instituto Nacional de Investigação Agronómica, LMA Herbarium, Maputo, Mozambique

†Universidade Eduardo Mondlane, LMU Herbarium, Maputo, Mozambique



**Tabela 1. 301 espécies foram listadas para a Lista Vermelha.**

As categorias	Número de espécies
Extinto (EX)	1
Em Perigo Crítico (CR)	6
Em Perigo (EN)	6
Vulnerável (VU)	109
Baixo Risco Quase Ameaçado (LR-nt)	16
Baixo Risco Preocupação Menor (LR-lc)	23
Dados Insuficientes (DD)	139
<b>Total</b>	<b>300</b>

A avaliação da Lista Vermelha foi feita para as espécies:

- Endémicas e quasi- endémicas de Moçambique
- Circunscritas a áreas pequenas ou habitats
- Utilizadas (madeira, espécies medicinais, ornamentais)
- Próximas de áreas de grande impacto (áreas de povoamento, áreas com desenvolvimento agrícola e industrial)

#### Aplicação das Categorias da Lista Vermelha

Foi aplicada as categorias da IUCN (1994) que tiveram como base as evidências acerca do número, tendência de desaparecimento e distribuição dos taxa. Factores como a pressão humana sobre a espécie, a proximidade de áreas de assentamento e de desenvolvimento agrícola e industrial foi levada em consideração. Por exemplo os habitats das espécies estariam mais degradados se ocorressem perto de assentamentos humanos ou zonas de desenvolvimento agrícola ou industrial.

A categoria *Vulnerável D2* foi aplicada nos casos em que a planta foi somente encontrada em localidades típicas ou quando tivesse uma distribuição limitada. A categoria *Dificiente de Dados* foi aplicada nos casos onde não houvesse informação disponível sobre as ameaças à espécie. As categorias ameaçadas (*Criticamente Ameaçadas*, *Ameaçadas*, e *Vulnerável*) foram aplicadas sempre que houvesse um perigo eminente de desaparecimento da espécie. Excepção para a *Raphia australis* e para as 13 espécies de *Encephalartos* registadas para Moçambique, cuja informação da sua distribuição é relativamente melhor conhecida.

#### Resultados e Discussão

##### A Lista Vermelha

Algumas espécies ameaçadas de Moçambique foram listadas nas seguintes publi-

cações: “*The World List of Threatened Trees*” (Oldfield *et al.* 1998) que listou 78 espécies para Moçambique; “*1997 IUCN Red Data List of Threatened Plants*” (Walter & Gillett 1998) listou 89 espécies vasculares de Moçambique, incluindo árvores. Várias espécies quasi-endémicas ocorrendo em Moçambique foram listadas por Hilton-Taylor (1996) na Lista Vermelha para a Suazilândia (Lebombos) e a África do Sul (Maputoland).

300 espécies foram listadas para a Lista Vermelha. Destas espécies, 122 foram listadas como sendo *Criticamente Ameaçadas* (CR), *Ameaçadas* (EN) e *Vulneráveis* (VU); 139 foram categorizadas como *Deficiência de Dados* (DD). Virtualmente quase todas as espécies DD tinham uma ou duas coleções de herbário, muito dispersas entre si e com pouquíssima informação nas respectivas etiquetas. Complicando ainda mais, muitas espécies não estavam correctamente identificadas. O facto de poucos inventários florísticos terem sido realizados no Centro e Sul do País levou a que a maior parte das espécies com mais informação fosse do Sul do País.

A avaliação baseada nas novas categorias da IUCN (1994), que tomou em conta aspectos quantitativos resultou na exclusão de algumas espécies de plantas. As espécies *Dombeya cymosa*, *Carpodiptera africana*, *Corchorus jumodii* e *Grewia glandulosa* que tinham sido representadas na primeira lista, foram excluídas desta lista. Isto é parcialmente devido ao facto de o sistema e critérios de categorização da IUCN (1994) basearem-se em dados quantitativos. Estes critérios excluem estas espécies devido a sua abundância no seu estado natural.

Em relação as famílias listadas na Lista Vermelha, as Rubiaceae, Fabaceae (Leguminosae) e Euphorbiaceae estão muito bem representadas, sendo este um resultado esperado devido ao facto de serem famílias grandes e relativamente bem estudadas. A família Orchidaceae está razoavelmente bem estudada mas pouco representada no

Lista Vermelha devido a falta de informação de campo. Por exemplo a *Eulophia biloba* é conhecida a partir de uma espécimen colhida na Beira (1895). Existem vários exemplos similares nas orquídeas (*Eulophia bissacata*, *Disperis mozambicense*, *Habenaria mossambicensis* e *Liparis hemipiloides*). Em relação a família Poaceae pouco se sabe pois muitas das espécies são conhecidas apenas de uma localidade específica se bem que isto seja resultado de pouca atracção para colheita de gramíneas. Muitas espécies de gramíneas, particularmente das zonas costeiras poderão ter sido introduzidas devido as trocas com outros Países da região e Ilhas.

Cerca de 177 das espécies endémicas listadas ocorrem principalmente nas regiões de Maputoland, a sul, e Chimanimani, no centro do País. 77 destas espécies foram listadas como quasi-endémicas pois ocorrem também na África do Sul, Suazilândia e Zimbabwe. Contudo espera-se que o País possua muito mais espécies endémicas especialmente no Norte do País. Daí a necessidade da realização do referido trabalho de campo nessa região do País, à volta do Rio Rovuma.

#### Espécies de Plantas Úteis e Ameaçadas

Em Moçambique os principais grupos de plantas úteis são as espécies madeiras, medicinais, alimentares e ornamentais. Apesar de nem todas as plantas úteis constarem na Lista Vermelha, elas devem ser monitoradas uma vez que são potenciais candidatas ao mesmo no futuro. A exportação de madeiras é uma actividade que a continuar deverá ser monitorada pois é muito importante para a economia do País. Algumas espécies de madeiras tais como: *Milicia excelsa* (LR-nt) e *Azelia quanzensis* (LR-nt) constam na Lista Vermelha e essas deverão merecer um controle efectivo quer pela Direcção Nacional de Floresta e Fauna Bravia na atribuição de quotas quer pelas Alfândegas no controle do movimento fronteiriço. Outras espécies muito utilizadas são as espécies medicinais nomeadamente a *Waburgia salutaris* que é largamente usada na cura de complicações da garganta

**Tabela 2. Famílias com maior número de espécies na Lista Vermelha.**

Famílias	Número de espécies
Rubiaceae	26
Fabaceae	20
Euphorbiaceae	15
Zamiaceae	13



**Cross-checking distribution records of poorly-known taxa in LMA Herbarium. (Photo: J.S. Golding)**

pela população em Moçambique (Bandeira *et al.* 2001).

Cerca de 70% da população moçambicana utiliza a medicina tradicional para os seus cuidados primários de saúde (World Conservation Monitoring Centre 1992). Mercados urbanos em Maputo e Beira vendem várias espécies medicinais que são colhidas em várias regiões do País. Espécies ameaçadas tais como a *Warburgia salutaris* e *Encephalartos* espécies (espécie ornamental) que já constam na Lista Vermelha são

ilegalmente exportadas e vendidas nos países vizinhos.

As maiores ameaças às espécies em Moçambique são:

- Exploração desenfreada dos recursos naturais para lenha e carvão
- Desenvolvimento industrial
- Práticas tradicionais de agricultura
- Assentamentos e urbanização

As zonas mais sensíveis são as zonas costeiras, as zonas na periferia das principais

cidades devido a grande densidade populacional. Nestas áreas ocorre principalmente a deflorestação onde grandes áreas têm sido devastadas para lenha e carvão. Na zona Sul de Moçambique a criação de projectos de desenvolvimento e a urbanização poderá ser uma ameaça a algumas espécies. Práticas tradicionais de agricultura, bem como a agricultura em monocultura são potenciais ameaças. Em termos de habitats ameaçados poderemos mencionar as matas do Sul, as florestas costeiras constituídas maioritariamente pelo Mangal e matas com espécies madeireiras.

## Conclusões e Recomendações

Na compilação da Lista, apareceram vários obstáculos os quais variaram desde a falta de informação à falta de uma listagem nacional e informação incompleta ou não actualizada. Informação a partir das espécimes de herbários é insuficiente para determinar o estado de uma espécie vegetal na Lista Vermelha de Moçambique. O conhecimento da flora de Moçambique está limitado ao sul do País.

Inventários na zona central e norte do País são necessários por forma a actualizar a informação científica e aumentar o número de colecções nos herbários. A colheita de informação das espécies endémicas e quasi-endémicas é especialmente importante. Colaboração com Países vizinhos (Malawi, África do Sul, Suazilândia, Tanzânia e Zimbábue) e trabalho colaborativo são elementos importantes que podem dar assistência na compilação dos inventários botânicos. Esta assistência servirá de base na planificação da conservação no País, estratégias para o uso sustentável dos recursos e prioridades de pesquisa no futuro.

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**Participants at the RDL Workshop held in Maputo. (Photo: J.S. Golding)**



# EXTINCT & THREATENED

## ACANTHACEAE

### *Blepharis dunensis* Vollesen

Status: VU B1B2cD2

Endemism: Endemic

Threats: Mining

Distribution: Zambézia, Nampula

Coastal sand dunes, 0–25 m. Eight records from four localities, including recent collections from Moebese and Momo.

### *Blepharis gazensis* Vollesen

Status: VU B1B2cD2

Endemism: Endemic

Distribution: Gaza

Colophospermum woodland.

### *Blepharis swaziensis* Vollesen

Status: VU D2

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: Maputo

Open bushland and grassland. Lebombo narrow endemic. Also in South Africa and Swaziland.

### *Blepharis torrei* Vollesen

Status: VU D2

Endemism: Near-endemic

Distribution: Niassa

Two collections from a locality in Mozambique (one from Tonzonia). Acacia-Brachystegia boehmii wooded grassland on concrete-like clayey hardpan, altitude 875 m.

### *Duvernoia aconitiflora* A.Meeuse

Status: VU B1B2cD2

Endemism: Near-endemic?

Threats: Damming, agriculture

Distribution: Maputo

Forest margins, sometimes along rivers. It is probable that the Umbeluzi Dam has had an impact, the species could be extinct in Mozambique. One collection from Swaziland (Hlotikulu); also in South Africa.

## AMARANTHACEAE

### *Celosia pandurata* Baker

Status: VU D2

Endemism: Endemic

Distribution: Manhica e Sofala, Tete, Zambézia

Known from forests in central Mozambique.

## ANACARDIACEAE

### *Lannea stuhlmannii* (Engl.) Engl. var. *tomentosa*

Dunkley

Status: VU D2

Endemism: Endemic?

Distribution: Tete, Manhica

Widespread in the Flora zambesiaca area.

### *Ozoroa gomeziana* R. & A.Fern.

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

Known only from the type.

### *Rhus refracta* Eckl. & Zeyh.

Status: VU D2

Distribution: Sofala

Found in deciduous forest. Also in South Africa.

## ANNONACEAE

### *Hexabolus mossambicensis* N.Robson

Status: VU D2

Endemism: Endemic?

Distribution: Nampula, Cabo Delgado, Niassa

Reported to be rare. Known only from about five localities in forest.

### *Xylopia collina* Diels

Status: VU D2

Endemism: Near-endemic

Distribution: Cabo Delgado

It is found in open woodland or thickets and on territory at 200–810 m. Also in Tonzonia.

## APIACEAE

### *Centella obtriangularis* Cannon

Status: VU D2

Endemism: Endemic

Distribution: Manhica

Endemic to Chimanimoni, known from the Mozambique side. In wet grassy slopes or banks.

## ASTERACEAE

### *Vernonia muelleri* Wild subsp. *muelleri*

Status: VU D2

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic. Also in Zimbabwe.

## BALSAMINACEAE

### *Impatiens psycantha* Launert

Status: VU D2

Endemism: Endemic

Distribution: Nampula, Zambézia

Altitude of 800 m. Found in Brachystegia forest.

### *Impatiens psychadelphiodes* Launert

Status: VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Zambézia, Sofala

### *Impatiens salpinx* Schulze & Launert

Status: VU D2

Endemism: Near-endemic

Distribution: Manhica

Altitude of 1,550 m. In wet conditions. Also in Zimbabwe.

## BIGNONIACEAE

### *Dolichandrone alba* (Sim) Sprague

Status: VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation, harvesting

Distribution: Gaza, Maputo, Inhambane

Found in dry deciduous woodland, fringing forests or thickets on sandy soils mainly near the coast. This is a utilised species.

## BOMBACACEAE

### *Rhodognaphalon mossambicense* (A.Robyns)

A.Robyns

*Bambax massambicensis* A.Robyns

Status: VU D2

Endemism: Endemic

Threats: Harvesting, collection

Distribution: Niassa, Zambézia

This species is apparently cultivated around Quelimane and the trunks are used for dugout canoes. Found in a variety of habitats.

## CANELLACEAE

### *Warburgia salutaris* Engl.

Status: VU A2cd

Threats: Harvesting

Distribution: Maputo

Common name 'chiboho'. Fairly common in southern Mozambique. Wide distribution range outside Mozambique but heavily utilised according to baseline reports. Global status is Endangered.

## CAPPARACEAE

### *Maerua andradae* Wild

Status: VU D2

Endemism: Endemic

Distribution: Cabo Delgado, Niassa

It is found in low-altitude Acacia woodland.

### *Maerua scandens* (Klotzsch) Gilg

Status: VU D2

Endemism: Endemic

Distribution: Gaza

The species is known from dense Brachystegia woodland, apparently rather rare.

## CELASTRACEAE

### *Elaeodendron fruticosum* N.Robson

Status: VU B1B2cD2

Endemism: Endemic

Distribution: Inhambane, Gaza

Known only from the thicket in coastal areas.

### *Maytenus mossambicensis* (Klotz.) Blakelock var.

*guruensis* N.Robson

Status: VU D2

Endemism: Endemic?

Distribution: Zambézia

Known only from two collections.

## CHENOPODIACEAE

### *Sarcocornia mossambicensis* Brenan

Status: EN B1B2c

Endemism: Endemic

Threats: Habitat degradation, urban expansion, desiccation

Distribution: Inhambane

Apparently confined to a few salt marshes.

### *Sarcocornia natalensis* (Bunge) A.J.Scott

Status: VU B1B2cD2

Threats: Habitat degradation, urban expansion, desiccation

Distribution: Maputo

Apparently confined to a few salt-marshes. Also in South Africa.

### *Suaeda* sp. Caldeira & Marques 599

Status: EX

Endemism: Endemic

Threats: Habitat degradation, urban expansion, desiccation

Distribution: Maputo

Known only from one specimen (collected in 1965)

which is known from salt marshes near the coast. The only toxin in this genus in the Flora zambesiaca region that grows near the coast.

## COMBRETACEAE

**Combretum coudotisepalum** Exell & Garcia

Status: VU D2

Endemism: Endemic

Distribution: Nampula, Niassa

Reported to be rare. Known only from about five localities in thickets.

**Combretum stocksii** Sprague

Status: VU D2

Endemism: Endemic

Distribution: Zambézia, Cabo Delgado, Niassa

In dense evergreen forest.

**Pteleopsis borbosae** Exell

Status: VU D2

Endemism: Endemic

Distribution: Niassa

At low elevation in Acacia savanna.

## COMMELINACEAE

**Tricerotello drummondii** Brenan

Status: VU D2

Endemism: Near-endemic?

Distribution: Nampula

Known only from two collections (Mozambique and Zimbabwe).

## CONNARACEAE

**Rourea minor** (Gaertn.) Alston

Status: VU D2

Endemism: Endemic?

Distribution: Sofala

Known only from a single collection.

## CONVOLVULACEAE

**Ipomoea venosa** (Desr.) Roem & Schultes var.

**obtusifolola** Verdc.

Status: VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Maputo

**Turbino longifloro** Verdc.

Status: VU D2

Endemism: Endemic

Distribution: Inhambane, Maputo, Gaza

In sandy soil at 310 m. It is a globose herb.

## CRASSULACEAE

**Crossulo exponso** Dryand. var. **longifolia** R.Fern.

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

**Crassula leachii** R.Fern.

Status: VU D2

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Manhica e Sofala

Known from granite rocks. Known only from two collections.

**Crassula maputensis** R.Fern.

Status: EN B1B2c

Endemism: Near-endemic

Distribution: Maputo

Also in South Africa.

**Crossulo murrumbolensis** R.Fern.

Status: VU B1B2cD2

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Zambézia, Gaza

In the savannas of mountainous slopes.

**Kolonchoe fernandesii** Raym.-Hamet

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: Nampula

Known only from the type locality (1950). In xerophytic forest near the river or in open places in forests.

**Pteroccephalus centenii** Cannon

Status: VU D2

Endemism: Endemic

Distribution: Manhica

This species is known only from the type specimen.

Found at the edge of a cloud forest dominated by

Podocarpus.

## CUCURBITACEAE

**Coccinia subglobosa** C.Jeffrey

Status: VU D2

Endemism: Endemic

Distribution: Nampula

Found in coastal forest at 40–130 m. Known only from this locality.

## DICHPETALACEAE

**Dichopetulum zambesionum** Torre

Status: VU D2

Endemism: Endemic

Distribution: Cabo Delgado, Zambézia

In deciduous and secondary woodland.

**Dichopetulum mendoncae** Torre

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

In mixed woodland.

## EBENACEAE

**Diospyros anitae** F.White

Status: VU D2

Endemism: Endemic

Distribution: Nampula

Known only from the type locality. Found in

Brachystegia woodland at 450 m.

## ERICACEAE

**Erica pleiotricha** S.Moore var. **blaerioides** (Wild)

R.Ross

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica e Sofala, Maputo

Found in damp places amongst rocks near summits of mountains at altitudes of 900–2,300 m. Also in Zimbabwe.

**Erica pleiotricha** S.Moore var. **pleiotricha**

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica e Sofala, Maputo

Found in damp places among rocks near summits of mountains 1,800–2,400 m. Also in Zimbabwe.

**Erica wildii** Brenan

Status: VU D2

Endemism: Endemic?

Distribution: Manhica e Sofala

Found in upland grassland and savanna and amongst rocks. Altitude 1,050–2,400 m. Also in Zimbabwe.

## EUPHORBACEAE

**Croton oceroides** Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

Locally common on the margins of dry coastal forest in pollid sands. The species is known only from the type collection.

**Croton inhombonensis** Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

This is a very distinctive species. It is known only from two collections. It is found on low-altitude coastal plains in dry sandy soils with *Androstachys johnsonii*.

**Croton leuconeurus** Pax subsp. **mossambicensis** Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: Manhica e Sofala

**Euphorbia plenispina** S.Carter

Status: VU D2

Endemism: Endemic

Distribution: Sofala, Inhambane

Known only from the type (Corvolho 1019 (1968)).

Found amongst lichens.

## FLACOURTIACEAE

**Homalium mossambicensis** Paiva

Status: VU B1B2cD2

Endemism: Endemic

Distribution: Cabo Delgado, Zambézia

In lowland forest.

## GESNERIACEAE

**Streptocarpus brochynemo** Hilliard & B.L.Burt

Status: VU D2

Endemism: Endemic

Gorongozo endemic. On rocks or tree trunks in forest.

**Streptocarpus grondis** N.E.Br. subsp.

**septentrionalis** Hilliard & B.L.Burt

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica

*Chimonimoni* endemic. On damp quartzitic rock in stream gullies. Also in Zimbabwe.

**Streptocarpus michelmorei** B.L.Burt

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica

*Chimonimoni* endemic. Also in Zimbabwe.

**Streptocarpus myoporoides** Hilliard & B.L.Burt

Status: VU D2

Endemism: Endemic

Distribution: Nampula

## LEGUMINOSAE: CAESALPINIOIDEAE

**Icuria dunensis** Wieringa

Status: EN A2c

Endemism: Endemic

Threats: Harvesting

Distribution: Nampula, Zambézia

In large communities on sandy, coastal dunes. Forms nearly monospecific forests on older dunes in dry land. Confused with *Hymenaea verrucosa*. The timber is valuable but wood is not durable. Bark is stripped to make cones. Known from a number of specimens.



## LEGUMINOSAE: MIMOSOIDEAE

### *Acacia torrei* Brenan

Status: VU D2  
Endemism: Endemic?  
Distribution: Sofala  
Found in savanna.

### *Entada mossambicensis* Torre

Status: VU D2  
Endemism: Endemic  
Distribution: Nampula  
A forest species.

### *Entada schlechteri* (Harms) Harms

Status: VU A1cB1B2cD2  
Endemism: Endemic  
Threats: Urban expansion  
Distribution: Maputo, Gaza

### *Mimosa mossambicensis* Brenan

Status: VU D2  
Endemism: Endemic  
Distribution: Tete

### *Xylia mendoncae* Torre

Status: VU D2  
Endemism: Endemic  
Distribution: Inhambane  
Known only from the type collection.

## LEGUMINOSAE: PAPILIONOIDEAE

### *Rhynchosia chimanimaniensis* Verdc.

Status: VU D2  
Endemism: Near-endemic  
Distribution: Manhica  
Chimonimoni endemic. Altitude of 1,500–1,900 m. Also in Zimbabwe.

## LINACEAE

### *Hugonia elliptica* N.Robson

Status: VU D2  
Endemism: Endemic  
Distribution: Zambézia  
Altitude of 150 m. Habitat unknown.

### *Hugonia grandiflora* N.Robson

Status: VU D2  
Endemism: Near-endemic  
Distribution: Niassa  
Evergreen forest at 500 m. Also in Tonzonio.

## LOBELIACEAE

### *Lobelia cobaltica* S.Moore

Status: VU D2  
Endemism: Near-endemic  
Distribution: Manhica  
Chimonimoni endemic. Also in Zimbabwe?

## LORANTHACEAE

### *Englerina schlechteri* (Engl.) Polhill & Wiens

Status: VU D2  
Endemism: Endemic  
Distribution: Maputo

## LYTHRACEAE

### *Ammania elate* R.Fern.

Status: VU D2  
Endemism: Endemic  
Distribution: Zambézia  
In marshy places of riverbanks.

### *Nesaea moggii* R.Fern.

Status: VU D2  
Endemism: Endemic  
Distribution: Nampula  
Known only from the type. In freshwater swamps near the coast. Possibly known only from the type collection by Mogg 32410 (1965).

### *Nesaea pedroi* R.Fern. & Diniz

Status: VU D2  
Endemism: Endemic  
Distribution: Cabo Delgado, Nampula  
In marshy places.

### *Nesaea pygmaea* R.Fern. & Diniz

Status: VU D2  
Endemism: Endemic  
Distribution: Nampula  
Near the coast?

### *Nesaea ramosa* R.Fern.

Status: VU D2  
Endemism: Endemic  
Distribution: Inhambane  
Various habitats.

### *Nesaea ramosissima* R.Fern. & Diniz

Status: VU D2  
Endemism: Endemic  
Distribution: Niassa  
In swamps and on riverbanks.

### *Nesaea spathulata* R.Fern.

Status: VU D2  
Endemism: Endemic  
Distribution: Sofala  
In wetlands in black soil. Altitude of 32 m.

## MALPIGHIACEAE

### *Triaspis nelsonii* Oliv. subsp. *canescens* (Engl.)

Launert  
Status: VU D2  
Endemism: Endemic  
Distribution: Maputo, Gaza  
Apparently known only from Mozambique, although recorded very close to the South African border.

## MALVACEAE

### *Hibiscus torrei* Baker

Status: VU D2  
Endemism: Endemic  
Threats: Human degradation, agriculture  
Distribution: Niassa, Tete  
Known from damp, humid places.

## MELASTOMATACEAE

### *Dissotis angustifolia* A. & R.Fern.

Status: VU D2  
Endemism: Endemic  
Distribution: Nampula  
Coastal area.

### *Dissotis pulchra* A. & R.Fern.

Status: VU D2  
Endemism: Near-endemic  
Distribution: Manhica  
Chimonimoni endemic, along streams and rock crevices.  
Altitude of 1,650 m. Also in Zimbabwe.

### *Memecylon insulare* A. & R.Fern.

Status: VU D2  
Endemism: Endemic  
Distribution: Inhambane  
On recent sandstones.

### *Pseudosbeckia swynnertonii* (E.G.Baker) A. & R.Fern.

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica  
Grows at 1,350 m altitude. Known only from a single collection (1964). Found in *Brachystegia* woodlands along the rivers. Also in Zimbabwe.

## MONTINIACEAE

### *Grevea eggelingii* Milne-Redh. subsp. *echinocarpa* (Mendes) Verdc.

Status: VU D2  
Endemism: Near-endemic  
Distribution: Cabo Delgado  
Riverine forest. Also in Tanzania.

## MORACEAE

### *Dorstenia zambesiaca* Hijman

Status: VU D2  
Distribution: Manhica & Sofala  
Possibly a taxonomic problem. Reported to be one of the rarest Moraceae. The type is from Mozambique, collected by Müller & Pope 520 (1971). Also known from Tonzonio and Kenya. In leaf litter of mixed evergreen forest.

## OCHNACEAE

### *Ochna beirensis* N.Robson

Status: VU B1B2cD2  
Endemism: Endemic  
Distribution: Sofala  
Known from deciduous woodland in evergreen scrub near sea level.

## PASSIFLORACEAE

### *Adenia mossambicensis* de Wilde

Status: VU D2  
Endemism: Endemic  
Distribution: Cabo Delgado, Nampula  
On granite; altitude of 450 m.

### *Adenia zambesiensis* R. & A.Fern.

Status: VU D2  
Endemism: Endemic  
Distribution: Zambézia

## POACEAE

### *Baptorhachis foliaceae* (Clayton) Clayton

Status: VU D2  
Endemism: Endemic  
Distribution: Nampula  
Monospecific genus.

### *Danthoniopsis chimanimaniensis* (Phipps) Clayton

Status: VU D2  
Endemism: Near-endemic?  
Distribution: Manhica  
Chimonimoni endemic in rocky places along streams. Also in Zimbabwe.

### *Digitaria appropinquata* Goetgh.

Status: VU D2  
Endemism: Endemic  
Distribution: Zambézia

### *Digitaria fuscopilosa* Goetgh.

Status: VU D2  
Endemism: Endemic  
Distribution: Manhica

### *Digitaria megasthenes* Goetgh.

Status: VU D2  
Endemism: Endemic  
Distribution: Niassa, Zambézia

## POLYGALACEAE

*Polygala francisci* Exell  
Status: VU D2  
Endemism: Endemic  
Distribution: Manhica, Inhambane  
Open bush in white sand and on the edges of dense mixed woodland.

## RHIZOPHORACEAE

*Cassipourea obovata* Alston  
Status: VU D2  
Distribution: Cabo Delgado  
Known only from the type (collected in 1911).

## RUBIACEAE

*Anthospermum ammannioides* S.Moore  
Status: VU D2  
Endemism: Near-endemic?  
Distribution: Manhica  
Chimonimoni endemic. Found at forest edges. Known from very high altitudes. (2,300 m). In Zimbabwe, it is known from Stonehenge Plateau.

*Anthospermum vallicola* S.Moore  
Status: VU D2  
Endemism: Near-endemic  
Distribution: Sofala  
Known only from the summit of Mount Peni of the Chimonimoni in Zimbabwe. Altitude of 1,700–2,600 m. It is found in scrub dominated by Erica species.

*Conostomium gazense* Verdc.  
Status: VU D2  
Endemism: Endemic  
Distribution: Gaza  
The ecology of this species is unknown.

*Oldenlandia verrucitesta* Verdc.  
Status: VU D2  
Endemism: Endemic  
Distribution: Zambézia  
Thin soil over rock.

*Spermacoce kirkii* (Hiern) Verdc.  
Status: VU B1B2cD2  
Endemism: Endemic  
Distribution: Inhambane, Sofala  
Open shady places near the seashore. Often associated with mangroves.

## RUTACEAE

*Fagara schlechteri* Engl.  
Status: VU B1B2cD2  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Maputo, Inhambane  
Coastal dunes.

## SAPINDACEAE

*Allophylus mossambicensis* Exell  
Status: VU B1B2cD2  
Endemism: Endemic  
Distribution: Maputo, Gaza, Inhambane  
Forest, including sacred forest. Found in coastal dunes, mixed forests and forest margins.

*Deinbollia borbonica* Scheff.  
Status: VU A2cB1B2bcD2  
Distribution: Nampula  
Recently recorded as being common around Mamo in mining concession areas. Also in Tanzania, Kenya and Somalia.

## STERCULIACEAE

*Cola mossambicensis* Wild  
Status: VU A1a  
Endemism: Near-endemic  
Threats: Agriculture  
Distribution: Zambézia, Manhica  
The main subpopulations occur in Mozambique. In evergreen forest up to about 600 m (above this altitude replaced by *C. greenwayi*). The species is said to be rare. Apparently also in Malawi.

*Dombeya lastii* K.Schum.  
Status: VU B1B2cD2  
Endemism: Endemic  
Distribution: Zambézia

*Dombeya leachii* Wild  
Status: VU B1B2D2  
Endemism: Endemic  
Distribution: Nampula  
On inselbergs.

*Sterculia appendiculata* K.Schum. ex Engl.  
Status: VU A1ad  
Threats: Harvesting  
Distribution: Tete, Manhica e Sofala  
Under pressure for firewood, timber for local construction; regeneration difficult. Regarded as being of secondary quality. In coastal and riverine forest. Also known from Molawi (lower Shire River) and the former Tongonyiko area. Modest reduction in the abundance of this species.

*Sterculia quinqueloba* (Garcke) K.Schum.  
Status: VU A1ad  
Threats: Harvesting  
Distribution: Gaza, Inhambane, Manhica e Sofala  
Under pressure for firewood, timber for local construction, regeneration difficult. Regarded as being of secondary quality. Modest reduction in the abundance of this species. Grows in other countries.

## TURNERACEAE

*Tricliceras auriculatum* (A. & R.Fern.) R.Fern.  
Status: VU D2  
Endemism: Endemic  
Distribution: Nampula, Zambézia  
On granitic rocks.

*Tricliceras elatum* (A. & R.Fern.) R.Fern.  
Status: VU D2  
Endemism: Endemic  
Distribution: Nampula  
From savanna, xerophytic scrub on sandy soils.

*Tricliceras lanceolatum* (A. & R.Fern.) R.Fern.  
Status: VU D2  
Endemism: Endemic  
Distribution: Manhica, Nampula  
In open Brachystegia forest or sandy or clay sands near the coast.

*Tricliceras longipedunculatum* (Mast.) R.Fern. var. *eratense* R.Fern.  
Status: VU D2  
Endemism: Endemic  
Distribution: Nampula  
Along river margins.

## VAHLIACEAE

*Vahlia capensis* (L.f.) Thunb. subsp. *macrantha* (Klotzsch) Bridson  
Status: VU D2  
Endemism: Endemic  
Threats: Damming  
Distribution: Zambézia  
Collected along sand banks.

## VISCACEAE

*Viscum littoreum* Polhill & Wiens  
Status: VU D2  
Endemism: Endemic?  
Distribution: Cabo Delgado  
Also possibly in Tanzania.

## VITACEAE

*Cissus bathyrrhakodes* Werderm.  
Status: VU D2  
Distribution: Zambézia, Manhica e Sofala  
In two localities in coastal/central Mozambique. Also in Tanzania.

*Cyphostemma barbosae* Wild & R.B.Drumm.  
Status: EN B1B2cC2b  
Endemism: Endemic  
Threats: Habitat degradation, urban expansion  
Distribution: Maputo  
The locality of this species is known to be degraded and under considerable human pressure.

*Cyphostemma trachyphyllum* (Werderm.) Descoings  
Status: VU D2  
Distribution: Cabo Delgado  
One locality in northern Mozambique. In sandy soils, and also found in coastal Tanzania.

## ZAMIACEAE

*Encephalartos aplanatus* Vorster  
Status: EN A1acdB1B2abcd  
Endemism: Near-endemic  
Threats: Collection  
Distribution: Maputo  
Also found in Swaziland. This species was described from a population of about six individuals near the Swaziland–Mozambique border. Subsequently, several subpopulations have been found. There are at least 2,000 individuals remaining in the wild in Mozambique. More than 50% of the population has been poached. Age-class structure is skewed. Globally, this species is considered VU A1acdB1B2abcdeC2o.

*Encephalartos chimanimaniensis* R.A.Dyer & I.Verd.  
Status: EN C2a  
Endemism: Near-endemic  
Threats: Collection  
Distribution: Manhica  
Chimonimani Mountain endemic, where it is associated with schist and quartzite at slightly higher altitudes than *E. manikensis*. The species is also known from Zimbabwe where it is now thought to be extinct. Global status is EN A1odC2o.

*Encephalartos lebomboensis* I.Verd.  
Status: CR A1acdeB1B2abcde  
Endemism: Near-endemic  
Threats: Collection  
Distribution: Maputo  
Also known from South Africa and Swaziland. A very small proportion of the global distribution range is in Mozambique. Poor recruitment observed at the known subpopulations in Mozambique. The species is probably not more widely distributed in Mozambique. Most of the plants are old and scattered in their distribution. Globally, it is categorised as EN A1odB1B2cdC2a.

*Encephalartos munchii* R.A.Dyer & I.Verd.  
Status: CR A1dB1B2cC2bd  
Endemism: Endemic  
Threats: Collection  
Distribution: Manhica  
Known only from a single, very distinctive locality in Mozambique. The species has been heavily poached to



<p>near extinction during the last few years. Only a few individuals remain.</p> <p><b>Encephalartos ngoyanus I. Verd.</b>  <b>Status:</b> CR C2aD  <b>Threats:</b> Collection  <b>Distribution:</b> Maputo</p> <p><i>The distribution of this species is centred in South Africa and Swaziland, and reaches the end of its range in southern Mozambique. Grows in a grassy habitat. No threats are evident at the known localities. Globally, it is categorised as VU B1B2c.</i></p> <p><b>Encephalartos pterogonius R.A.Dyer &amp; I. Verd.</b>  <b>Status:</b> CR A1dB1B2eC2bD  <b>Endemism:</b> Endemic  <b>Threats:</b> Collection  <b>Distribution:</b> Manhica e Sofala</p>	<p><i>The only known locality of this species is extremely inaccessible. Few individuals now remain at this locality as collectors have recently illegally removed many individuals.</i></p> <p><b>Encephalartos senticosus Vorster</b>  <b>Status:</b> CR B1B2ae  <b>Endemism:</b> Near-endemic  <b>Threats:</b> Collection  <b>Distribution:</b> Maputa</p> <p><i>This species is also known from South Africa and Swaziland. The population in Mozambique has declined to alarmingly low levels. Globally, it is considered as VU A1cd.</i></p> <p><b>Encephalartos umbeluziensis R.A.Dyer</b>  <b>Status:</b> CR A2cB1B2abcde  <b>Endemism:</b> Near-endemic</p>	<p><b>Threats:</b> Collection  <b>Distribution:</b> Maputa</p> <p><i>It is usually found in hot, dry river valleys. Also known from Swaziland. Globally, it is considered VU A1cdB1B2cdC2a.</i></p> <p><b>Stangeria eriopus (Kuntze) Baill.</b>  <b>Status:</b> VU C2bD1D2  <b>Threats:</b> Collection  <b>Distribution:</b> Maputo?</p> <p><i>Locality fairly safe. Also known from South Africa. Global status is LR-nt.</i></p>
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Ribaue granite hills are nodes for biodiversity. (Photo: J. Burrows)

# LOWER RISK

## ACANTHACEAE

*Sclerochiton apiculatus* Vollesen

Status: LR-lc

Distribution: Maputa

Common in vast numbers along roadsides in the rainy season. Also in KwoZulu-Natal (South Africa). Limited global distribution.

## ALOACEAE

*Aloe ballii* Reynolds

Status: LR-lc

Distribution: Manhica

Grows hanging down sheer rock faces. In South Africa, Swaziland and Zimbabwe. Limited distribution range.

## ANACARDIACEAE

*Ozoroa reticulata* (Baker f.) R. & A.Fern. subsp. *faveolata* R. & A.Fern.

Status: LR-nt

Endemism: Endemic

Distribution: Nampula, Niassa, Caba Delgada, Tete  
Found in dense, xerophytic closed forest.

## ANNONACEAE

*Xylopia torrei* N.Robson

Status: LR-nt

Endemism: Endemic?

Distribution: Gaza, Inhambane

Ory forests and forest margins. Altitudes of 100–150 m. The shrub grows to about 2 m tall.

## APOCYNACEAE

*Adenium swazicum* Stapf

Status: LR-lc

Endemism: Near-endemic

Distribution: Maputo

Known from at least five localities. A Lebomba endemic. Also known from South Africa and Swaziland.

## ASTERACEAE

*Gutenbergia westii* (Wild) Wild & G.V.Pope

Status: LR-nt

Endemism: Near-endemic

Distribution: Manhica

Chimanimani endemic. Also in Zimbabwe. Found in woodland.

## BORAGINACEAE

*Cordia stuhlmannii* Gurke

Status: LR-lc

Endemism: Endemic?

Distribution: Zambézia, Sofala

Found in thicket.

## CAPPARACEAE

*Cleome bororensis* (Klotzsch) Oliv.

Status: LR-lc

Endemism: Near-endemic

Distribution: Sofala, Maputa, Zambézia, Gaza, Inhambane

It is said that the species has an extensive range in Mozambique. Also in Tonzonia.

## COMBRETACEAE

*Combretum lasiocarpum* Engl. & Diels

Status: LR-lc

Endemism: Endemic

Distribution: Nampula, Zambézia, Niassa

In dry deciduous tree or shrub savanna at lower altitudes.

## CRASSULACEAE

*Kalanchoe hametiorum* Raym.-Hamet

Status: LR-nt

Endemism: Endemic

Distribution: Nampula, Zambézia

The type is from Nampula, collected in 1963. Found amongst rocks.

## DICHAPETALACEAE

*Dichapetalum barbosae* Torre

Status: LR-lc

Endemism: Near-endemic

Distribution: Cabo Delgado, Zambézia, Manhica e

Sofala

Found in dry bush and on margins of rivers. Recently recorded in Tanzania.

## EUPHORBIACEAE

*Jatropha scaposa* Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

Distribution: Nampula, Sofala, Maputo

Known from several collections. Found along coastal plains in sandy soil. Seems to be widespread along the coast of Mozambique, but very little is known.

## LEGUMINOSAE: CAESALPINIOIDEAE

*Afzelia quanzensis* Welw.

Status: LR-nt

Threats: Forestry exploitation

Distribution: Tete, Gaza, Inhambane, Niassa, Caba Delgado, Zambézia

Over-exploitation for local construction industry and for exportation. Common names are 'chanfuta', 'kangauwa' and 'muoco'. The species grows in Tropical Africa (height to 35 m), but in Mozambique and KwoZulu-Natal (South Africa), it grows up to 20 m. Often the dominant species in deep sandy soil, mainly in sandveld forest. For the past 50 years, used extensively for the manufacture of plywood, panelling, parquet floors and musical instruments. A tree with a goad shape can be obtained from seed after seven years. Found throughout Mozambique.

## LEGUMINOSAE: MIMOSOIDEAE

*Xylia torreana* Brenan

Status: LR-lc

Distribution: Manhica e Sofala, Inhambane

Found in deciduous woodland with *Colaphospermum mopane*. This is a widely distributed species. Also in Zimbabwe, Zambia and South Africa.

## LEGUMINOSAE: PAPILIONOIDEAE

*Milletia mossambicensis* Gillett

Status: LR-nt

Threats: Forestry exploitation

Over-exploitation for local construction industry and for exportation. Widespread in Mozambique.

*Milletia stuhlmannii* Taubert

Status: LR-lc

Threats: Forestry exploitation

Over-exploitation for local construction industry and for exportation. Widespread in Mozambique.

## LORANTHACEAE

*Agelanthus igneus* (Danser) Polhill & Wiens

Status: LR-nt

Endemism: Near-endemic?

Distribution: Cabo Delgada

Also in Tanzania.

## LYTHRACEAE

*Nesaea linearis* Hiern

Status: LR-lc

Endemism: Endemic

Distribution: Nampula, Zambézia

Widespread in Mozambique. On clay soil.

## MELIACEAE

*Khaya anthotheca* (Welw.) C.DC.

Status: LR-lc

Distribution: Manhica e Sofala, Gaza, Inhambane, Caba Delgado, Nampula, Niassa

Known from the following countries: Angola, Cameroon, Congo, Côte d'Ivoire, OR Congo, Ghona, Liberia, Malawi, Mozambique, Nigeria, Sierra Leone, Tonzonia, Uganda, Zambia and Zimbabwe.

## MENISPERMACEAE

*Cissampelos hirta* Klotzsch

Status: LR-lc

Endemism: Endemic

Distribution: Inhambane, Manhica, Maputo

## MORACEAE

*Milicia excelsa* Welw.

Status: LR-nt

Threats: Forestry exploitation

The species is being heavily harvested and exported.

## MYRTACEAE

*Syzygium masukuense* (Baker) R.E.Fr. subsp.

*pachyphyllum* F.White

Status: LR-nt

Distribution: Manhica

Found at 1,600 m. Also in Zimbabwe.

## OCHNACEAE

*Ochna angustata* N.Robson

Status: LR-nt

Endemism: Endemic

Distribution: Sofala, Zambézia

The species is known only from Beira northwards in areas within 40 km of the coast

## POACEAE

*Cenchrus mitis* Andersson

Status: LR-nt



Distribution: Nampula  
Coastal bushland. Also in Kenya and Tanzania.

**Eriochloa rovimensis (Pilg.) Clayton**

Status: LR-nt

Distribution: Caba Delgada  
Also in Tanzania.

**Panicum peteri Pilg.**

Status: LR-ic

Distribution: Manhica  
Also in Zimbabwe and Tanzania.

**Panicum pleianthum Peter**

Status: LR-ic

Distribution: Maputa  
From southern Mozambique coastal forest. Also in Kenya and Tanzania.

## RUBIACEAE

**Psychotria amboniana K.Schum. subsp. mossambicensis (Petit) Verdc.**

*Psychotria albidocalyx* var. *masambicensis* Petit

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation; human settlements  
Distribution: Maputa

Endemic to dune vegetation and forest at not more than 150 m above sea level. This species possibly occurs over a wide area. It is found in a sensitive habitat.

## SAPINDACEAE

**Allophylus torrei Exell & Mendonça**

Status: LR-ic

Endemism: Endemic

Distribution: Caba Delgada, Nampula  
Brachystegia woodland and amongst rocks. Known from many herbarium collections.

## SCROPHULARIACEAE

**Jamesbrittenia carvalhoi (Engl.) Hilliard**

Status: LR-ic

Endemism: Near-endemic

Distribution: Manhica e Safala  
Also in Zimbabwe.

## SOLANACEAE

**Solanum litoraneum A.E.Gonç.**

Status: LR-ic

Endemism: Endemic

Distribution: Inhambane, Maputa  
At 200 m above sea level. In the littoral vegetation of dunes. Very close to the sea.

**Solanum torreanum A.E.Gonç.**

Status: LR-ic

Endemism: Endemic

Distribution: Maputa  
Type is from Matala collected by Balsinhas 1466 (1969). Known only from Maputa from several collections. In dry Acacia forest, on sandy/sandy-clay soils at low altitudes, growing in ruderal places. Fairly localised.

## STERCULIACEAE

**Cola clavata Mast.**

Status: LR-ic

Endemism: Near-endemic?

Distribution: Zambézia, Safala  
Poorly known taxon. Also perhaps in Malawi.

**Sterculia schliebenii Mildbr.**

Status: LR-ic

Distribution: Caba Delgada

Also in Kenya and Tanzania.

## TILIACEAE

**Glyphaea tomentosa Mast. ex Oliv.**

Status: LR-ic

Endemism: Endemic

Distribution: Nampula, Zambézia, Safala, Niassa  
Occurs in deciduous woodland.

## ZAMIACEAE

**Encephalartos ferox Bertol.f.**

Status: LR-nt

Endemism: Near-endemic

Threats: Collection

Distribution: Maputa

Its characteristic habitat is wide coastal sand dunes although the species has been observed at a locality almost 150 km inland. The species may need to be monitored as many coastal dune areas in Mozambique are earmarked for development. Also known from KwaZulu-Natal (South Africa). Global status is LR-ic.

**Encephalartos gratus Prain**

Status: LR-nt

Threats: Collection

Distribution: Zambézia

Many localities are well protected by landmines and poor road infrastructure. The biggest predicted threats are coffee and tea plantations, and possibly afforestation. Recruitment is very good. Past population declines are less than 10%. Also known from Malawi. Global status is VU A2cd.

**Encephalartos manikensis (Gilliland) Gilliland**

Status: LR-nt

Threats: Collection

Distribution: Manhica

Usually found on large granite inselbergs and only in river valleys in places associated with forests. It has a wider distribution than *E. chimanimaniensis*. Many unrecognised names have been given to this taxon, such as *E. tangwendle*, *E. bandulensis* and *E. chinahazany*, but these are treated as illegitimate names. Also known from Zimbabwe. Global status is VU A1cd.

**Encephalartos turneri Lavranos & D.L.Goode**

Status: LR-ic

Endemism: Endemic

Threats: Collection

Distribution: Caba Delgada, Nampula

The species grows in shallow soils on steep, extremely inaccessible inselbergs. There are probably further subpopulations further inland. No threats are anticipated as areas around inselbergs are subjected to subsistence agriculture. Occurs in vast numbers.



**Icuria dunensis (Fabaceae)**, a recently described monotypic tree genus from Moëbase. It was described from a small coastal area that was earmarked for development. Many more species and genera await description not only in Mozambique, but in many other southern African countries. (Drawing: W. Wessels, permission obtained from J. Wieringa)

## ACANTHACEAE

**Crossandra fruticulosa** Lindau

**Status:** DD

Endemism: Near-endemic

Distribution: Maputo

Also from South Africa and Swaziland. Narrow distribution range.

**Crossandra pinguior** S.Moore

**Status:** DD

Endemism: Endemic

Distribution: Tete

Also from Zambia.

**Crossandra pyrophila** Vollesen

**Status:** DD

Endemism: Endemic

Distribution: Niassa, Zambézia

Also from Malawi.

**Ecobolium hastatum** Vollesen

**Status:** DD

Endemism: Endemic

Distribution: Gaza, Inhambane

Reported to be rare. Known only from two localities in bushland.

**Sclerochiton coeruleus** (Lindau) S.Moore

**Status:** DD

Endemism: Near-endemic

Distribution: Manhica, Inhambane, Maputo, Niassa, Zambézia, Gaza

Dry semi-deciduous forest, often on margins; altitude of 10–450 m. Also known from eastern Zimbabwe.

**Sclerochiton hirsutus** Vollesen

**Status:** DD

Endemism: Endemic

Distribution: Zambézia

Riverine forest; altitude 1,150 m.

## ALOACEAE

**Aloe hazeliana** Reynolds

**Status:** DD

Endemism: Near-endemic?

Distribution: Manhica

Chimonimoni endemic. Also in Zimbabwe. Collected in pockets of soil in rock fissures of altitudes up to 2,200 m.

**Aloe howmanii** Reynolds

**Status:** DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic, along the Zimbabwe–Mozambique border. Also in Zimbabwe. Grows hanging down on sheer rock faces. Altitudes of 1,600–2,000 m. Plants rarely survive in cultivation.

**Aloe munchii** Christian

**Status:** DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic. Altitude of 1,700 m. Also in Zimbabwe.

**Aloe plowesii** Reynolds

**Status:** DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic (known from the area along the border). Also in Zimbabwe. Grows in grass amongst sandstone boulders. Reynolds recognised two forms—shorter, narrow and more erect leaves at Martins Falls

(east of Point 71) and a more robust form at the head of 'Dead Cow Gulch'.

**Aloe rupestris** Baker

**Status:** DD

Threats: Urban expansion, habitat degradation

Distribution: Maputo

The species is found in tall bush and amongst Euphorbia and other trees. Also in South Africa and Swaziland.

**Aloe suffulta** Reynolds

**Status:** DD

Threats: Urban expansion, habitat degradation

Distribution: Maputo

The plant has a long inflorescence. Is a twiner.

**Aloe wildii** (Reynolds) Reynolds

**Status:** DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic. The species has been said to be extremely common. Also in Zimbabwe.

## AMARANTHACEAE

**Celosia nervosa** C.C.Towns.

**Status:** DD

Endemism: Endemic

Distribution: Niassa, Gaza, Inhambane, Maputo

Unclear whether it is more widespread and overlooked, or genuinely with a disjunct distribution. Known from a forest habitat.

## ANACARDIACEAE

**Lannea** sp. Medonça 909

**Status:** DD

Endemism: Endemic

Distribution: Cabo Delgado

Known only from the type that was collected in 1942. Reported to be rare in the wild. The herbarium material is insufficient for a formal taxonomic description. The young leaves and the inflorescence are similar to *L. antiscorbutia*.

**Lannea** sp. Torre & Paiva 12146

**Status:** DD

Endemism: Endemic

Distribution: Cabo Delgado

Known only from the type that was collected in 1964. Grows at altitudes of 2,200 m. The taxon is reported to be uncommon in the wild. The taxon appears to be similar to *L. stuhlmanni*.

**Rhus rehmanniana** Engl. var. *longecuneata* R. & A.Fern.

**Status:** DD

Endemism: Endemic

Distribution: Maputo

Found on rocky hills. Last recorded in 1947. Apparently known only from the type collection.

## ANNONACEAE

**Polalthia mossambicensis** Vollesen

**Status:** DD

Endemism: Endemic

Distribution: Zambézia

Found in forests.

**Uvariodesdron** sp. Medonça 2558A

**Status:** DD

Endemism: Endemic

Distribution: Manhica

Known only from the type collection (1944). The specimen consists of immature flowers; no fruits available. Grows in the margins of riverine forest.

## APOCYNACEAE

**Carissa praetermissa** Kupicha

**Status:** DD

Endemism: Endemic

Distribution: Zambézia, Gaza, Inhambane

Reported to be rare; fewer than five localities. Known from forests and woodland interfaces.

**Strophanthus hypoleucos** Stapf

**Status:** DD

Endemism: Near-endemic?

Distribution: Nampula, Zambézia

Found amongst rocks in woodland. Also in Tonzonio.

## ARECACEAE

**Raphia australis** Oberm. & Strey

**Status:** DD

Endemism: Near-endemic

Distribution: Maputo

Also in South Africa (KwaZulu-Natal).

## ASTERACEAE

**Bothriocline morrumballae** (Oliv. & Hiern) O.Hoff.

**Status:** DD

Endemism: Endemic

Distribution: Niassa, Zambézia

In forests. Reported to be rare and known from fewer than five localities.

**Bothriocline steetziana** Wild & G.V.Pope

**Status:** DD

Endemism: Endemic

Distribution: Niassa, Zambézia

Found amongst rocks in woodland. Reported to be rare and known from fewer than five localities.

**Vernonia inhacensis** G.V.Pope

**Status:** DD

Endemism: Endemic

Distribution: Gaza, Inhambane, Maputo

Found in forests.

## BALSAMINACEAE

**Impatiens balsamina** L.

**Status:** DD

Endemism: Endemic

Distribution: Niassa

Known only from one collection.

## CAPPARACEAE

**Maerua acuminata** Oliv.

**Status:** DD

Endemism: Near-endemic?

Distribution: Cabo Delgado

The species is apparently known only from the type collection; suspected to also occur in Tonzonio. It is uncertain whether it was collected on the Tonzonio side or on the Mozambican side.

**Maerua brunnescens** Wild

**Status:** DD

Endemism: Endemic

Distribution: Sofala, Zambézia, Inhambane, Maputo

In low-altitude dryland, often with *Acacia* species.



**Maerua schliebenii** Gilg  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Niassa  
*In forests and woodlands. Also in Tonzonio.*

CHENOPODIACEAE

**Salsola** sp. Mogg 29302  
**Status:** DD  
Endemism: Endemic  
Threats: Habitat degradation, urban expansion, dessication  
Distribution: Inhambane  
*The type was collected in 1958. Suspected to be known from an additional collection. Found in a coostol, soline habitat.*

CONVOLVULACEAE

**Ipomoea consimilis** Schulze-Menz  
**Status:** DD  
Endemism: Endemic  
Distribution: Manhica e Sofala  
*In forests and bushland habitots. Also in Tonzonio.*

**Ipomoea ephemera** Verdc.  
**Status:** DD  
Endemism: Endemic  
Distribution: Nampula, Zambézia  
*Not known elsewhere. Found in bushland and pons, in dampish soil.*

CRASSULACEAE

**Crassula swaziensis** Schonland var. *guruensis*  
**R.Fern.**  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Zambézia, Nampula  
*In South Africa and Swaziland. Collected near rivers ot 1,600 m.*

CUCURBITACEAE

**Coccinia fernandesiana** C.Jeffrey  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Nampula, Zambézia  
*Found in forests, woodlands and thicket habitots. Also in Tonzonio.*

**Eureiandra** sp. R.Fern. & Perreira 242  
**Status:** DD  
Endemism: Endemic  
Distribution: Inhambane  
*Known only from a single specimen collected in 1968. The specimen is sterile and in poor condition.*

**Momordica henriquesii** Cogn.  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Niassa  
*In forest ond Brachystegia woodland. Also in Tonzonio.*

**Momordica** sp. Torre & Paiva 9867  
**Status:** DD  
Endemism: Endemic  
Distribution: Niassa  
*Known only from the type collection (1964). In Brachystegia woodland ot altitudes of 280 m.*

**Peponium** sp. Torre 5578  
**Status:** DD  
Endemism: Endemic  
Distribution: Zambézia, Tete  
*Known only from two collections (Torre 5578 collected in 1934 ond Perreira, Sormanto & Marques 1720 collected in 1966). In moist grossland ot 1,380–1,420 m.*

CYCADACEAE

**Cycas thouarsii** Gaudich.  
**Status:** DD  
Distribution: Zambézia  
*Associated with the Zombezi Volley ond coostline.*

DICHAPETALACEAE

**Dichapetalum deflexum** (Klotzsch) Engl.  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Niassa, Manhica e Sofala  
*In bushlond. Also in Tonzonio.*

**Dichapetalum edule** Engl.  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Niassa  
*In forests ond thickets. Also in Tonzonio.*

**Dichapetalum macrocarpum** N.Krause  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Nampula  
*In Brachystegia woodland, bushlond ond thicket. Also in Tonzonio.*

EBENACEAE

**Diospyros inhacaensis** F.White  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Gaza, Inhambane, Maputo  
*In forests. Extends into KwoZulu-Notal (South Africa).*

**Diospyros** sp. Torre, Correira & Ladeira 18965  
**Status:** DD  
Endemism: Endemic  
Distribution: Tete  
*Known from a single specimen that was collected in 1973. Found in rocky ploces, on slopes ot 867 m.*

ERIOCAULACEAE

**Eriocaulon infaustum** N.E.Br.  
**Status:** DD  
Endemism: Endemic  
Distribution: Manhica, Sofala  
*Found in rice fields. It is probably extremely common yet little known.*

**Mesanthemum africanum** Moldenke  
**Status:** DD  
Endemism: Near-endemic?  
Distribution: Manhica  
*Chimonimoni endemic. Possibly also in Zimbabwe?*

ERYTHROXYLACEAE

**Nectaropetalum carvalhoi** Engl.  
**Status:** DD  
Endemism: Endemic  
Distribution: Nampula  
*Found in forests.*

EUPHORBIACEAE

**Acalypha** sp. Torre & Correira 14410  
**Status:** DD  
Endemism: Endemic  
Distribution: Zambézia  
*Known only from this collection (1966). It is found in secondory forest consisting of Brachystegia boehmii, Julbernadia globiflora, Albizia adianthifolia ond Milletia stuhlmanii on sandy cloy soil. Altitude 40 m.*

**Croton kilwae** Radcl.-Sm.  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Nampula  
*Found in forests. Also in Tonzonio.*

**Euphorbia clavigera** N.E.Br  
**Status:** DD  
Distribution: Maputo  
*Known from a number of localities in Maputo Province. Also in South Africa ond Swozilond. Associated with the Lebombo Mountains.*

**Euphorbia graniticola** L.C.Leach  
**Status:** DD  
Distribution: Manhica

**Jatropha latifolia** Pax var. *subeglandulosa* Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic  
Distribution: Maputo  
*It was collected in 1948 ond is known only from o single collection. It is found in wooded grosslond.*

**Jatropha subaequiloba** Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic  
Distribution: Inhambane  
*Found in swamps ond woodlands.*

**Monadenium torrei** L.C.Leach  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Nampula  
*In woodlond omongst rocks. Also in Tonzonio.*

**Phyllanthus medoncae** J.F.Brunel & Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic  
Distribution: Manhica e Sofala  
*Found in grosslond.*

**Tragia glabrata** (Mull.Arg.) Pax & K.Hoffm. var. *hispida* Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic  
Distribution: Maputo  
*It is not known from elsewhere. It is known from dry open bushland. Collected in 1940.*

**Tragia shirensis** Prain var. *glabriuscula* Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic  
Distribution: Nampula  
*It is found in dry bushlond. It is known only from the type collection. This variety occurs on the eastern limit of the ronge of the species.*

IRIDACEAE

**Tritionia moggii** Oberm.  
**Status:** DD  
Endemism: Endemic  
Distribution: Gaza, Inhambane, Maputo  
*In woodlands near the coast.*

LAMIACEAE

**Acollanthus viscosus** Ryding  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Manhica  
*Habitot unknown. Also in Zimbabwe.*

**Hemizygia fiabellifolia** S.Moore  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Manhica  
*Chimonimoni endemic. Also in Zimbabwe.*

MOZAMBIQUE

*Plectranthus kapatensis* (R.E.Fr.) J.K.Morton  
**Status: DD**  
 Endemism: Endemic?  
 Distribution: Manhica  
*Only known from the Chimonimonis in Mozambique.*

*Plectranthus psammophilus* Codd  
**Status: DD**  
 Endemism: Near-endemic  
 Threats: Habitat degradation, urban expansion  
 Distribution: Maputo, Inhambane  
*Very localised in South Africa and Mozambique. No recent collections for Mozambique.*

LEGUMINOSAE: CAESALPINIOIDEAE

*Berlinia orientalis* Brenan  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Nampula  
*Found in forest and thicket. Also in Tonzonio.*

LEGUMINOSAE: MIMOSOIDEAE

*Adenopodia schlechteri* (Harms) Brenan  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Maputo, Manhica e Sofala  
*In thicket.*

LEGUMINOSAE: PAPILIONOIDEAE

*Aeschynomene aphylla* Wild  
**Status: DD**  
 Endemism: Near-endemic?  
 Distribution: Manhica  
*Chimonimoni endemic. Also in Zimbabwe?*

*Baphia macrocalyx* Harms  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Nampula  
*Found in o variety of habitots. Also in Tonzonio.*

*Indigofera fulgens* Baker  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Cabo Delgado, Inhambane, Gaza, Zambézia  
*The type is from Mozambique/Tonzonio in the Rovumo River oreo. Collected in 1861 by Kirk s.n. Grows in thicket and sondy soils at on olitude of 500 m. Unsure whether this species is known only from the type.*

*Indigofera kuntzei* Harms  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Cabo Delgado, Inhambane, Gaza, Zambézia  
*In grossland. Also in Tonzonio.*

*Millettia bussei* Harms  
**Status: DD**  
 Distribution: Cabo Delgado  
 Also in Tanzania.

*Tephrosia aequilata* Baker subsp. *namuliana*  
 Brummitt  
**Status: DD**  
 Distribution: Zambézia

*Tephrosia forbesii* Baker subsp. *inhacensis*  
 Brummitt  
**Status: DD**  
 Distribution: Inhambane, Gaza, Maputo

LOGANIACEAE

*Strychnos myrtoides* Gilg & Busse  
**Status: DD**

Endemism: Near-endemic  
 Distribution: Cabo Delgado  
*In woodland. Also in Tonzonio.*

LYTHRACEAE

*Hionanthera graminea* R.Fern. & Diniz  
**Status: DD**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Nampula  
*Not recorded since 1935, could have been effected by the development of Nompulo Town. Found in swamps.*

*Hionanthera mossambicensis* R.Fern. & Diniz  
**Status: DD**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Nampula  
*Not recorded since 1936, could have been effected by the development of Nompulo Town. Found in swamps.*

*Hionanthera torrei* R.Fern. & Diniz  
**Status: DD**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Nampula  
*Not recorded since 1937, could have been effected by the development of Nompulo Town. In the soil, on rocks.*

*Nesaea gazensis* R.Fern.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Gaza  
*Mud in riverbed.*

MALPIGHIACEAE

*Thespesiopsis mossambicensis* Exell & Hillcoat  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Nampula  
*Found in forest.*

*Triaspis suffulta* Launert  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Manhica e Sofala  
*Found in bushland.*

MALVACEAE

*Hibiscus rupicola* Exell  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Tete  
*Amongst rocks. Locality is o smoll oreo (mountain) in o rural setting.*

MELASTOMATACEAE

*Memecylon sessilicarpum* A. & R.Fern.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Nampula  
*Common around Momo in forests.*

*Memecylon sousae* A. & R.Fern.  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Manhica e Sofala, Maputo  
*Found growing in forest, bushlond and thicket. Also in Tonzonio.*

*Memecylon* sp. Mogg 32462  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Nampula  
*Known only from the type (1965). The specimen does*

*not consist of fruit or flowers. Collected near the coast.*

*Memecylon* sp. Pedro & Pedrôgão 5170  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Cabo Delgado  
*Known only from the type (1948). The specimen is sterile.*

*Memecylon* sp. Swynnerton 1074  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Manhica e Sofala  
*Known only from the type that was collected in o forest (1906). The fruits of the specimen are immature. Collected at 130 m olitude. Resembles M. sousae but the leaves ore smoller and glossier.*

*Memecylon torrei* A. & R.Fern.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Nampula  
*Found in o coastol oreo on territorio.*

MENISPERMACEAE

*Tinospora mossambicensis* Engl.  
**Status: DD**  
 Endemism: Near-endemic  
*Grows in forest. Also in Tonzonio.*

MORACEAE

*Ficus muelleriana* C.C.Berg  
**Status: DD**  
 Endemism: Endemic  
 Threats: Urban expansion, agriculture  
 Distribution: Manhica  
*Known only from two localities in Mozambique; surrounding hobitot is miombo (Uapaca and Brachystegia microphylla). Found on hilltops and slopes in sondy looms. The species is o climbing, scrombling fig. Also in Zimbabwe.*

*Ficus scassellatii* Pamp.  
**Status: DD**  
 Threats: Habitat degradation  
 Distribution: Sofala, Zambézia  
*Also known from Zimbabwe, Molawi, Kenya, Tonzonio and further ofield. Possibly more widely distributed in Mozambique thon in Zimbabwe. Mid-olitude, mixed semi-evergreen forest. Altitude of 1,000–1,850 m.*

MYRTACEAE

*Eugenia* sp. Wild, Goldsmith & Müller 6646  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Manhica e Sofala  
*15 m toll tree. Endemic to Horoni–Mokurupini near the Mozambique–Zimbabwe border. Grows in forest hobitots. Also in Zimbabwe.*

OLEACEAE

*Jasminium* sp. Torre 4438  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Zambézia  
*Known only from o single specimen (1942). Found in dense scrub on river margins.*

*Olea chimanimani* Kupicha  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Manhica  
*Also recorded from Zimbabwe. The only specimen for Mozambique is by Dutton 77 (1973) from the Chimonimonis. Known from scrub vegetation in quartzite crocks.*



## ORCHIDACEAE

### *Cyrtorchis glaucifolia* Summerh.

Status: DD

Endemism: Endemic

Distribution: Nampula

Known only from Mozambique. Two specimens are cited, and this species is known only from Nampula Province in the vicinity of Ribôue. It is epiphytic on Xerophyta, and found at an altitude of 500 m.

### *Disperis mozambicensis* Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Sofala

The type is from the Pungwe River, collected in 1895 (Schlechter s.n.). Known only from the type collection. It is stated that the species is endemic. It was found growing amongst bushes on the riverbank.

### *Eulophia biloba* Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Sofala

The type was collected in 1895 (Schlechter s.n.) Collected at 7 m above sea level. The species is known only from this gathering. It was found in coastal vegetation. It is known only from a photograph at Kew as the holotype was destroyed in Berlin.

### *Eulophia bisaccata* Kraenzl.

Status: DD

Endemism: Endemic

This species is known only from the description, which lacks a drawing or an exact locality. Known only from the type specimen and collected by Junod. No other information available.

### *Eulophia petersii* Reichb.f.

Status: DD

Distribution: Tete

Occurring mainly in sandy areas and in swamps during rainy seasons.

### *Habenaria hirsutissima* Summerh.

Status: DD

Endemism: Endemic

Distribution: Manhica

The type was collected 10 km from Mutuoli by Gomes & Sauso, on the Mutuoli-Malemo Road in 1954. The species is known only from this collection.

### *Habenaria mossambicensis* Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Inhambane

The type was collected 16 km from Beira in 1895. The holotype was destroyed in Berlin. It is not known from elsewhere.

### *Liparis hemipiloides* Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Inhambane

The type was collected in 1898 from the Mozambique Company area at 25 Mile Station, in "primeval" forest at Danda at 30 m. This species is incompletely known. The holotype was destroyed in Berlin.

## POACEAE

### *Brachiaria* sp. Ellis 6094

Status: DD

Distribution: Maputo

Also in South Africa and Swaziland.

### *Enneapogon* sp. Ellis 5500

Status: DD

Distribution: Gaza

Occurs only on limestone in the Pofuri region (South Africa) and probably in the adjoining area of Mozambique. The genus is under revision.

### *Eragrostis sericata* Cope

Status: DD

Endemism: Endemic

Distribution: Gaza/Inhambane, Niassa

The type was collected by Gomes and Sousa (1939) at an altitude of 30–100 m. Known from fewer than five collections. Not known from collections older than the 1930s. Found in sandy ground in dry forest. Distinctive densely, silky-villous basal leaf sheaths.

## PODOCARPACEAE

### *Podocarpus falcatus* (Thunb.) R.Br. ex Mirb.

Status: DD

Distribution: Gaza, Maputo

Southern Mozambique—Maputo River. Common names are 'msongo', 'mulatchen', 'um-kobo'. Dioecious.

Widespread in the Western Cape forests (South Africa).

This species is overutilised throughout its range. It is protected in the Maputo river areas. However, it is rare in Mozambique. Found in gallery forests.

## POLYGALACEAE

### *Polygala limae* Exell

Status: DD

Endemism: Endemic

Distribution: Cabo Delgado

The type only is known.

### *Polygala torrei* Exell

Status: DD

Endemism: Endemic

Distribution: Maputo

It is a perennial herb of dry pasture grass in dry open bush. Could be a weed?

## RESTIONACEAE

### *Restio quartziticola* H.P.Linder

Status: DD

Endemism: Near-endemic

Distribution: Manhica

Also in Zimbabwe.

## RHAMNACEAE

### *Ziziphus pubescens* Oliv. subsp. *glabra*

R.B.Drumm.

Status: DD

Distribution: Gaza

This is a shrub or small tree up to 4 m tall. It is said to be rare.

## RUBIACEAE

### *Buchnera namuliensis* Skan

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Zambézia

In swamps.

### *Canthium racemosum* S.Moore

Status: DD

Distribution: Cabo Delgado

Also in Tanzania.

### *Coffea zanguebariae* Lour.

Status: DD

Distribution: Niassa, Manhica e Sofala, Nampula

Also in Tanzania and eastern Zimbabwe.

### *Cuviera schliebenii* Verdc.

Status: DD

Endemism: Near-endemic

Distribution: Nampula, Zambézia

In forests. Also in Tonzonio.

### *Cuviera tomentosa* Verdc.

Status: DD

Endemism: Near-endemic

Distribution: Cabo Delgado

Also in Tonzonio.

### *Oldenlandia* sp. Torre & Correia 17482

Status: DD

Endemism: Endemic

Distribution: Cabo Delgado

In soil over rocks. Found growing with Entada.

### *Pavetta catophylla* K.Schum.

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Maputo

Found in forests.

### *Pavetta gracillima* S.Moore

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Maputo

In forests.

### *Pavetta incana* Klotzsch

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala

In forests.

### *Pavetta klotzschiana* K.Schum.

Status: DD

Endemism: Endemic

Possibly found in forests.

### *Pavetta mocambicensis* Bremek.

Status: DD

Endemism: Endemic?

Distribution: Nampula

Likely to be on the mainland (Nampula).

### *Pavetta pumila* N.E.Br.

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala

Possibly found in forests.

### *Pavetta revoluta* Hochst

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Maputo

Possibly found in forests.

### *Pavetta tendaguruensis* Bremek.

Status: DD

Endemism: Near-endemic

Distribution: Nampula

In forests and grasslands. Known from four localities.

Also in Tanzania.

### *Pseudomussaenda mozambicensis* Verdc.

Status: DD

Endemism: Endemic

Distribution: Nampula

Collected amongst rocks. Known only from single locality.

### *Psychotria* sp. Balsinhas 1376

Status: DD

Endemism: Endemic

Distribution: Inhambane

Known only from the type (1968). Found in littoral dunes.

### *Psydrax micans* (Bullock) Bridson

Status: DD

Distribution: Cabo Delgado

Also known from Tanzania.

***Psydrax moggii* Bridson****Status:** DD

Endemism: Endemic

*Found in swamps and forests. No other information available.****Spermacoce schlechteri* K.Schum.****Status:** DD

Endemism: Endemic?

Distribution: Nampula, Inhambane, Zambézia

*There is a specimen from Tanzania with which it may be conspecific.****Triainolepis sancta* Verdc.****Status:** DD

Endemism: Endemic

Distribution: Manhica e Safala

*In woodlands and thicket.*

## RUTACEAE

***Teclea crenulata* (Engl.) Engl.****Status:** DD

Endemism: Endemic

*Known only from a single collection (Stuhlmann 562).****Vepris allenii* Comm. ex. A.Juss.****Status:** DD

Distribution: Niassa

*It is recorded from the hills. It is known only from the north of Mozambique and possibly the old Tanganyika area. The species is known from dry deciduous forests, and has a very narrow distribution. Record by Daw 68 (1912) is possibly the only collection.*

## SAPINDACEAE

***Allophylus chirindensis* Baker f.****Status:** DD

Distribution: Manhica

*Also in Zimbabwe. 15 m tall tree with a silver-grey bark. In medium-altitude evergreen forest.*

## SCROPHULARIACEAE

***Striga diversifolia* P.Lima****Status:** DD

Endemism: Endemic

Distribution: Nampula

*Known only from a single locality.*

## SOLANACEAE

***Solanum litoraneum* A.E.Gonc.****Status:** DD

Distribution: Inhambane

*The type is from Inhaca (Maputa) by Magg 27597 (1957). The shrub is 0.2–1.0 m tall. Grows in littoral vegetation of dunes, in thickets or margins of dense bushland and bushes beside the seashore. Known from many collections.*

## STERCULIACEAE

***Cola discoglypsemnophylla* Brenan & Jones****Status:** DD

Endemism: Near-endemic

Distribution: Nampula

*In forests. Known from fewer than five localities. Also in Tanzania.****Hermannia micropetala* Harv.****Status:** DD

Endemism: Endemic

Distribution: Manhica e Safala, Gaza, Inhambane, Maputa

*Habitat unknown.*

## TILIACEAE

***Grewia conocarpa* K.Schum.****Status:** DD

Endemism: Near-endemic

Distribution: Niassa

*Coastal districts, either in thickets or in forest patches; collected along the Tanzanian border.****Grewia hornbyi* Wild****Status:** DD

Endemism: Endemic

Distribution: Manhica e Safala, Maputa

*In woodland.****Grewia limae* Wild****Status:** DD

Endemism: Near-endemic?

Distribution: Caba Delgada

*Small tree of coastal woodlands. Possibly also in Tanzania.*

## VITACEAE

***Cyphostemma amplexum* (Baker) Descoings****Status:** DD

Endemism: Near-endemic

Distribution: Nampula

*Altitude of 50 m. Also recorded in Tanzania.*

## GENTIANACEAE

***Farao involucrata* (Klotzsch) Knoblauch****Status:** no status

Endemism: Endemic

Distribution: Nampula, Zambézia

*Found growing amongst rocks.***Inhambitanga Forest, Mozambique. (Photo: J. Burrows)**





Patricia Craven\* & Sonja Loots\*

## Introduction

The Red List status of some Namibian plants has been presented in five previous publications (Table 1) and the preliminary Red List presented here is an attempt to integrate existing and new data to form a basis on which to build the Threatened Plants Programme of the National Botanical Research Institute (NBRI). The Checklist of Namibian Plant Species (Craven 1999, 2000a, b) provided the nomenclatural and taxonomic framework, and much of the information used in the new Red List was accumulated during its compilation. Endemic taxa and those previously listed were assessed first, but the Red List excludes some priority taxa owing to time constraints. It is, however, the aim of NBRI to continue the RDL process and publish a more comprehensive list by the end of 2002.

## Methods

Information dossiers for RDL plants, compiled over the past few years at WIND, were used as a starting point for the list; these dossiers include illustrations, maps based on georeferenced herbarium specimens, literature references, and notes (for example, look-alike plants, uses, and so forth). Specimen label information from herbarium holdings in the SpmnDb (WIND) and PRECIS (PRE) databases was added; data from voucher specimens (for exam-

ple, of habitat and frequency) were also taken into consideration. In a few cases, herbarium staff verified specimen identifications. Field trips were organised to search for certain taxa and some assessments were based on this work; field assessment sheets were completed and added to the dossiers for future evaluations.

Only spermatophytes were evaluated because the taxonomy and distribution of lower plants are still poorly known. As this is an ongoing project in Namibia, a certain degree of caution was exercised when doing the assessments. Although the *Data Deficient* (DD) category was often applied to indicate inadequate threat information, it was also applied to taxonomically poorly known Namibian taxa. A taxon was always evaluated as DD when no voucher specimens could be traced, and DD was also applied in the following cases:

- Known from type or a very limited number of specimens only
- Taxonomically uncertain
- Known from one specimen in Namibia, but widespread or well-known elsewhere
- Not yet confirmed to occur in Namibia, or notes regarding distribution are unclear
- Taxon under revision

This approach was adopted to identify gaps and important areas needing research, especially fieldwork. The VU D2 (*Vulnerable*)

**Capital:** Windhoek, largest city, Walvis Bay, main port

**Area:** 824,268 km<sup>2</sup>

**Languages:** English (official), Afrikaans, German, Ju/'hoan, Khoekhoegowab (Nama/Damara), Oshidonga, Oshikwanyama, Otjiherero, Rucgiriku, Rukwangali, Setswana, Silozi, Thimbukushu

**Currency:** Namibian dollar (N\$), on a par with South African Rand

**Total indigenous spermatophyte taxa:** 3,961

**Total endemic spermatophyte taxa:** 602

**Total indigenous moss and fern taxa:** 161

**Total RDL plants:** 1,152

**Focal RDL institutions:** NBRI, which includes WIND and NPGRC

**Number of Protected Areas:** 21 parks and nature reserves, one Transfrontier Park (Botswana-Namibia-South Africa), and several other formally protected areas.

**Population:** 1,701,330 **Growth Rate:** 3.1% **Density:** 2.3 people/km<sup>2</sup>

**Phytogeography:** The Zambeian regional centre of endemism is in the northeast, the Kalahari-Highveld Transition Zone, and the Karoo-Namib regional centre of endemism in the southwest.

**Flora:** Dry woodland in the northeast, becoming drier towards the south and the coast, through bushland and wooded grassland to desert. The escarpment forms a transition between the coastal desert and the savannas of the interior.

**Sources:** Anonymous 2000, Craven 1999, Giess 1971, Maggs 1998, Maggs, Kolberg & Hines 1994, Maho 1998, White 1983

**Table 1. RDL status of Namibian plants in previous publications.**

Publication	Number of Namibian taxa evaluated	Comments
Hall <i>et al.</i> 1980	56	
Hilton-Taylor 1996a	385	Information provided by WIND
Hilton-Taylor 1997	14	Information provided by WIND
Walter & Gillett 1998	77	Assessments not based on Hilton-Taylor (1996a, 1997) are questionable
Oldfield <i>et al.</i> 1998	11	Only four assessments completed with Namibian input

\*National Botanical Research Institute, Namibia

category was used when the plant was known from the type specimen only, unless it was taxonomically uncertain, in which case it was considered DD.

Because Namibia's conservation legislation is under review and changes are expected, no information was provided on whether a plant occurs within a protected area or is currently protected.

## Results and Discussion

A total of 1,152 spermatophyte taxa was assessed (Table 2). We have not compared trends indicated by this assessment with those of previous publications, because the 1994 IUCN categories differ so significantly from the previous categories. The knowledge base of Namibian taxa has also been enlarged significantly since Hilton-Taylor (1996a). The major threats to the survival of Namibia's plants—mining and collection of specific plants—are also now better known.

### Red List Assessments

The two taxa previously listed as being extinct in Namibia were re-evaluated as DD. Sterile material was collected of what appears to be *Protea gagedi*, indicating that an assessment can only be made after further field work has been conducted. The other taxon, *Conophytum ricardianum* subsp. *rubiflorum*, also requires fieldwork, as it occurs in a remote area that is not regularly visited. We strongly recommend that although the DD category is used to indicate that no assessment has been made as yet, all taxa categorised as DD should not be treated as if they are unimportant; they should be given the same degree of protection as threatened taxa until such time that more information becomes available to make an assessment.

In addition, the following genera were considered DD, as they are either under revision, on loan from WIND, or awaiting publication: *Lycium*, *Orbea* and other stapeliads, *Geigeria*, *Othonna*, *Albuca*, and numerous monocotyledonous taxa on loan to the herbarium in Hamburg (H). Genera that need taxonomic revision and were therefore not assessed include *Crinium*, *Salsola*, and *Aptosimum*, as well as numerous Mesembryanthemaceae.

Species that were included in previous RDL assessments for Namibia, but were subsequently found not to occur in Namibia or that are now synonyms are *Eulophia holubii*, *Calliandra redacta*, *Manulea leptosiphon*, and *Orbeopsis tsumebensis*.

On the whole, there were insufficient data on generation cohorts and population decline for Criterion A to have been used with confidence, even when inferred or suspected. This criterion was used for only three taxa in the *Critically Endangered* (CR) and *Endangered* (EN) categories. There are, however, numerous taxa known from a limited number of individuals or with a restricted area of occupancy, and in cases such as these, Criterion D was used extensively, particularly under the VU category. The other most commonly used criterion was Criterion B, as data on the number of locations or suspected population decline are more readily available.

Criteria used in the 1994 IUCN assessments are clearly quantitative and such data are usually not yet available in Namibia. Based on experience from elsewhere in southern Africa, inferred or suspected population decline (uncertainty) was therefore applied to taxa that occur in particularly sensitive areas, such as the Sperrgebiet. For example, experts who investigated the impact of the Lesotho Highlands Water Project (LHWP) on the flora were of the opinion

that the LHWP would not directly threaten the status of any of the vulnerable species. Field experience, however, showed that increased accessibility to remote areas results in removal of plants known to have sale value, even when they are not directly affected by construction work (Talukdar 1994). The Sperrgebiet, with its unique flora of generally high conservation value, is under increasing pressure as the area is being opened up to mining developments and tourism. Numerous taxa not directly affected by existing (or proposed) mining projects were therefore considered threatened in this RDL compilation, based on suspected patterns of threat. By listing taxa such as these, we hope that the case for these areas to be conserved will be strengthened.

It often appears as if not all RDL species need a management programme for their protection. Taxa that are endemic to, for example, the Brandberg massif, appear to be well out of reach of most destructive mechanisms and, despite having limited distribution ranges, populations are likely to remain stable there. Recent ecotourism and research interests on the Brandberg (aided by helicopter deliveries of water) have, however, resulted in abnormally large numbers of people near the summit. The perception that Brandberg endemics are safe from disturbance is thus altered and these species may now require some sort of management programme for their protection. This sort of phenomenon is particularly important in an arid environment where plants are not apparent during dry periods, resulting in accidental destruction (Table 3).

### Application of the Red Data List

This Red Data List is far from complete. The aims of the Namibian Threatened Plants Programme are to:

- Prioritise plant taxa that require conservation
- Centralise any information emanating from research or monitoring
- Co-ordinate mechanisms that will make this information available
- Assist in developing appropriate conservation strategies

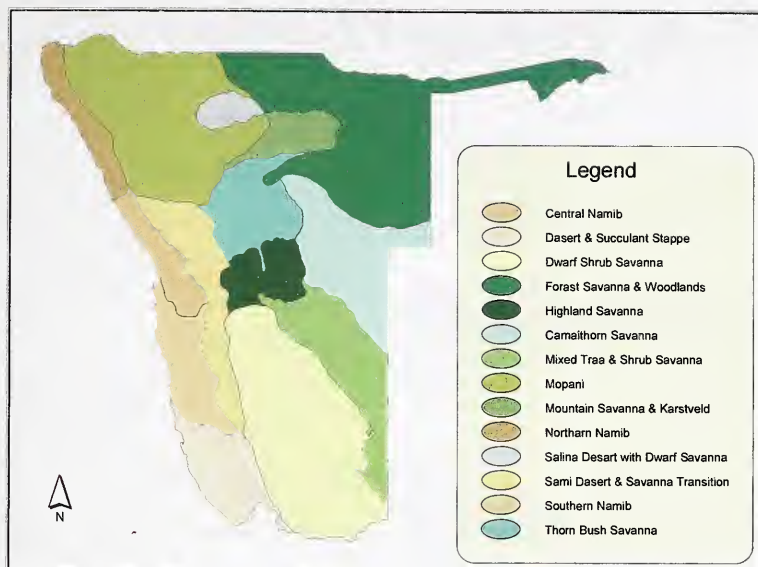
**Table 3. Endemism amongst taxa on the Namibian RDL.**

Endemism	Number of taxa
Confirmed endemic	417
Suspected endemic	16
Confirmed near-endemic	275
<b>TOTAL</b>	<b>708</b>

**Table 2. Results of the RDL assessments for Namibia.**

Category	Number of taxa
Spermatophyte taxa in Namibia	3,961
Taxa on the RDL (EX, ExW, CR, EN, VU, LR-nt, LR-lc & DD)	1,152
Critically Endangered (CR)	8
Endangered (EN)	80
Vulnerable (VU)	199
Lower-Risk near threatened (LR-nt)	84
Lower-Risk least concern (LR-lc)	516
Data Deficient (DD)	265
Endemics with RDL assessment	433
Endemics that are EX, ExW, CR, EN & VU	179
Taxa known from one specimen only	>45





**Vegetation map of Namibia.**

These goals will be achieved by, in the first place, maintaining a basic store of information, that is, a databank of standardised information with dossiers on priority species indicating monitoring or research needs, as well as distribution maps, descriptions, and names of all interested parties and their fields of expertise. Second, taxonomic or field research will be promoted and carried out where possible, and information required for assessments will be sought. In order to optimise limited research resources—both human and financial—a strategy needs to be developed for evaluating and prioritising botanical projects and programmes. The RDL assessments may be used as a criterion for prioritisation. Complementary conservation strategies in support of *in situ* conservation, like *ex situ* seed banking, will also be more effective if there is a uniform strategy and defined targets.

During the compilation of this list, taxonomists from all over the world were very helpful and knowledgeable. By contrast, collaboration with specialists in other fields—such as conservationists, ecologists and interested laypersons—has been limited, owing to issues relating to correct taxonomic identification. All attempts must be made to encourage collection of voucher specimens with detailed notes, so that the plants concerned can be correctly identified. Few, if any, non-taxonomists can identify the rarer Namibian taxa, especially those that occur sporadically (a common feature of dry areas). The Namibian RDL process has also encouraged collaboration

with other regional scientists in order to carry out global assessments of cross-border species. In addition, the programme endeavours to contribute to public awareness and environmental education on threatened plants in Namibia, which to date has been insufficient.

One example of the value of the current Red List initiative is illustrated by *Aloe pillansii*. Field work undertaken to establish its conservation status revealed that although the total number of plants was found to be higher than previously thought, the population is definitely declining. Mining activity is the major threat and the low levels of recruitment observed could not be fully explained. This has highlighted the need for further investigation and for urgent communication and action so that the populations can be conserved and monitored (Loots & Mannheimer, in press).

Meanwhile, new legislation on conservation (The Parks and Wildlife Management Bill 2001), which includes plants, has been drafted for Namibia. In this legislation, provision will be made for specially protected plants. Plants with a high conservation status, especially endemic plants that are classified as *Critically Endangered*, may in future be automatically added to this list. Unfortunately, the enforcement of this legislation may remain problematic as the responsible authority is severely understaffed.

Although Namibia's Environmental Assessment Policy is still regarded by some as insufficiently legally binding, numerous proposed development projects are following

the guidelines contained in the policy. This is indicated by various enquiries received by NBRI as to which plants are considered threatened. In order to cater for requests such as these, this Red List also incorporates numerous taxa categorised as LR-lc for the benefit of local conservationists and policymakers.

## Conclusion

With the National Development Plan II of Namibia and especially Vision 2030, rapid development in all sectors is envisaged in an attempt to improve the socio-economic conditions of all citizens. As a result, increased industry and burgeoning urbanisation are anticipated. Namibia's plant resources may therefore become increasingly threatened, and those that have already been assessed as CR, EN, or VU will be most at risk. These taxa will have to be closely monitored to prevent their extinction. Already, the financial implications of conservation are high and resources to undertake *in situ* conservation are continuously declining. There is therefore an urgent need to prioritise the taxa that must be conserved and to increase the knowledge base surrounding these taxa.

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*Adenia pechuelii*, categorised as **Endangered**. (Photo: H. Kolberg)

# EXTINCT & THREATENED

## ACANTHACEAE

*Hygrophila gracillima* (Schinz) Burkill

Status: VU B1B2cdC2aD1

Endemism: Endemic

Threats: Habitat degradation

Distribution: North

Its decline is due to pans drying up and over-use of water resources in the north.

*Monochma serotinum* P.G.Mey.

Status: VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: North-West

Known from the type only.

*Phaulopsis semicanica* P.G.Mey.

Status: VU D2

Endemism: Near-endemic

Distribution: North-West

*Ruellia curraeii* T.Anderson

Status: VU D2

Threats: Habitat degradation

Distribution: North-West

## AMARYLLIDACEAE

*Brunsvigia herrei* Leight. ex W.F.Barker

Status: VU D2

Endemism: Near-endemic

Threats: Mining

Distribution: South-West

Known from one collection only.

*Crinum paludosum* I.Verd.

Status: VU D2

Endemism: Endemic

Distribution: South-Central

*Haemanthus avasmontanus* Dinter

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: Central

Known from type specimens only, but is very distinct.

Grows on steep south-facing micaceous schist ledges.

*Namaquanula bruce-bayeri* D. & U.Müll.-Doblies

Status: VU D2

Endemism: Near-endemic

Threats: Mining

Distribution: South-West

*Strumaria barbarae* Oberm.

Status: VU D2

Endemism: Near-endemic

Threats: Collection

Distribution: South-West

Known from two farms only.

*Strumaria bidentata* Schinz

Status: EN B1B2c

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Diminutive and can be confused with *S. hardyana* (vegetatively). Grows in sand on exposed flats and amongst rocks.

*Strumaria hardyana* D. & U.Müll.-Doblies

Status: EN B1B2cdD1

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Can be confused in the vegetative state with *S. bidentata*.

*Strumaria phonolithica* Dinter

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: South-West

Occurs on wide ledges of steep south-facing slopes, benefits from fog. The species is in cultivation and has the largest flowers of the genus.

## ANACARDIACEAE

*Ozaroa namaquensis* (Sprague) Von Teichman &

A.E.van Wyk

Status: VU D2

Endemism: Near-endemic

Threats: Mining

Distribution: South-East

## APIACEAE

*Marlothiella gummifera* H.Wolff

Status: VU D2

Endemism: Endemic

Threats: Mining and prospecting

Distribution: South-West

Dwarf shrub that grows along coast, Namibian endemic genus.

## APOCYNACEAE

*Baynesia lophophora* Bruyns

Status: CR B1B2eC2b

Endemism: Endemic

Threats: Collection

Distribution: North-West

Known from one locality only.

*Brachystelma schinzii* (K.Schum.) N.E.Br.

Status: VU D2

Endemism: Endemic

Threats: Harvesting

Distribution: North-East

May be undercollected, but is utilised.

*Brachystelma schultzei* (Schltr.) Bruyns

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: Central

The plant grows in open places amongst scattered grass clumps where it is inconspicuous, unless in flower. May be undercollected.

*Caralluma peschii* Nel

Status: VU D1

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: North-West

*Cerapegia dinteri* Schltr.

Status: VU D1

Endemism: Endemic

Threats: Collection

Distribution: North-West

Inconspicuous species, may be undercollected.

*Cerapegia filiformis* (Burch.) Schltr.

Status: VU D2

Threats: Collection

Distribution: South-East

Remarkable case of vicariance. Extremely inconspicuous, but the flowers are striking.

*Cerapegia mafekingensis* (N.E.Br.) R.A.Dyer

Status: VU D2

Threats: Collection

Distribution: wide

Only collected a few times.

*Cerapegia pachystelma* Schltr.

Status: VU D1D2

Threats: Collection

Distribution: East-Central

Usually grows in deep soil with no evidence of rockiness. Occurs in a limited area. Flowers profusely and is easy to cultivate.

*Cerapegia paricyma* N.E.Br.

Status: VU D2

Threats: Habitat degradation, collection

Occurs on an island in the Zambezi River; little known, probably because it is fairly insignificant.

*Cerapegia stenantha* K.Schum.

Status: VU B1B2cdD1D2

Threats: Habitat degradation, collection

Distribution: North-East

Wetland species.

*Gomphacarpus glaucophyllus* Schltr.

Status: VU D2

Endemism: Endemic?

Distribution: North-East

Only one specimen collected in 1955.

*Hoodia alstanii* (N.E.Br.) Plowes

Status: VU D2

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

*Haadia juttae* Dinter

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: South-East

It looks like *H. gordonii* without flowers and occurs with it, but no hybrids or intermediates occur.

*Hoodia officinalis* (N.E.Br.) Plowes subsp.

*delaetiana* (Dinter) Bruyns

Status: EN B1B2bc

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Winter-rainfall species.

*Haadia pedicellata* (Schinz) Plowes

Status: VU D1

Endemism: Near-endemic

Threats: Collection

Distribution: North-West-Central, North-West

*Haadia ruschii* Dinter

Status: VU D1D2

Endemism: Endemic

Threats: Collection

Distribution: South-Central

Full of flowers in cultivation, so probably sought after, but has a dreadful smell.

*Hoodia triebneri* (Nel) Bruyns

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: Central

Very unusual.

*Huernia hallii* E. & B.M.Lamb

Status: VU D2

Endemism: Endemic

Threats: Collection

Distribution: North-West, South-East

Grows inside *Pentzia* bushes on flat-topped mountains in stony areas, so could be overlooked.



***Huernia plowesii* L.C.Leach****Status: EN B1B2e**

Endemism: Endemic

Threats: Collection

Distribution: South-Central

*Known mainly from plants in cultivation. On one farm they are scattered, but found in several places.****Lavrania haagnerae* Plowes****Status: EN B1B2eC2a**

Endemism: Endemic

Threats: Collection

Distribution: North-West

*Known from two localities only, on vertical dolomite cliffs. Additional localities may exist. Unusual features and habit for the genus make it attractive to collectors.****Lavrania perlata* (Dinter) Bruyns****Status: VU D2**

Endemism: Near-endemic

Threats: Collection

Distribution: South-West

*Known from very few collections in Namibia and from one locality, in cultivation.****Lavrania picta* (N.E.Br.) Bruyns subsp.*****parvipunctata* Bruyns****Status: VU D2**

Endemism: Endemic

Threats: Collection

Distribution: South-Central

***Microlooma poicilantherum* H.E.Huber****Status: VU D2**

Endemism: Near-endemic

Distribution: South-West

***Quaqua acutiloba* (N.E.Br.) Bruyns****Status: VU D2**

Threats: Mining, collection

Distribution: South-West

***Quaqua incarnata* (L.f.) Bruyns subsp.*****hottentotorum* (N.E.Br.) Bruyns****Status: VU C2a**

Threats: Mining, collection

Distribution: South-West

***Quaqua pruinosa* (Masson) Bruyns****Status: EN B1B2cdeC2a**

Endemism: Near-endemic

Threats: Habitat degradation, urban expansion, collection

***Stapelia pearsonii* N.E.Br.****Status: VU D2**

Endemism: Endemic

Threats: Collection

Distribution: South-East

***Stapeliopsis neronis* Pillans****Status: EN B1B2ce**

Endemism: Near-endemic

Threats: Collection, habitat degradation

Distribution: South-West

*Known from one collection only; on lower mountain slopes near riverbank.*

## APONOGETONACEAE

***Aponogeton azureus* H.Bruggen****Status: VU D2**

Endemism: Endemic

Threats: Grazing/browsing, urban expansion

Distribution: North-West

*Known from type only, collected in 1974 (very good rain year). Tubers of similar toxic are eaten.*

## ASPHODELACEAE

***Aloe argenteicauda* Merxm. & Giess****Status: VU B1B2e C2a**

Endemism: Endemic

Threats: Collection

Distribution: South-Central

*Seems to be restricted to dolomite oreos, could be confused with A. pachygaster.****Aloe buettneri* A.Berger****Status: VU D2**

Threats: Collection

Distribution: North-West

*Restricted to one form in Namibia but common elsewhere. Last collected in 1973.****Aloe corallina* I.Verd.****Status: EN D1**

Endemism: Endemic

Threats: Collection

Distribution: North-West

*Lost collected in 1965; grows on inaccessible perpendicular cliffs.****Aloe dewinteri* Giess****Status: VU D1**

Endemism: Endemic

Threats: Collection

Distribution: North-West

*Grows in rock crevices of steep dolomite precipices.****Aloe dinteri* A.Berger****Status: VU D1**

Endemism: Endemic

Threats: Collection

Distribution: North-West, North-West-Central

*Could be confused with A. sladeniana and A. variegata, grows on plains, in shade and in dolomite crevices.****Aloe erinacea* D.S.Hardy****Status: EN A1adB2cdC1C2a**

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*No recruitment from seed in one subpopulation.**Another, recorded in the 1980s, could not be found.****Aloe meyeri* van Jaarsv.****Status: EN B1B2e**

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-East

*Plants hanging from vertical south-facing cliffs in crevices—probably fairly inaccessible, except for specialist collectors.****Aloe microstigma* Salm-Dyck****Status: VU D1**

Threats: Mining, collection

Distribution: South-Central

*Grows on mountains and plains, distribution is restricted.****Aloe namibensis* Giess****Status: VU D1**

Endemism: Endemic

Threats: Habitat degradation, collection

Distribution: South-West-Central

***Aloe pachygaster* Dinter****Status: VU D1**

Endemism: Endemic

Threats: Collection

Distribution: South-West, South-Central

*Could be confused with A. claviflora and A. asperifolia, closely correlated with dolomite and block limestone.****Aloe pearsonii* Schonland****Status: EN B1B2bce**

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

*Recruitment seems to be very low in subpopulations observed.****Aloe pillansii* L.Guthrie****Status: EN B1B2bceC1**

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*A. pillansii and A. dichotoma cannot be distinguished when young; they do not flower until 2 m tall. No recruitment was seen.****Aloe ramosissima* Pillans****Status: VU A1c2cC2a**

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection, pests/disease

Distribution: South-West

***Aloe sladeniana* Pole-Evans****Status: VU C2a**

Endemism: Endemic

Threats: Collection

Distribution: North-West-Central

*Very pretty plant from intensely hot arid oreos on western escarpment, could be confused with A. variegata and A. dinteri.****Aloe viridiflora* Reynolds****Status: VU B1B2cC2aD1**

Endemism: Endemic

Threats: Collection

Distribution: Central

*Distribution is limited. No evidence of a continuing decline.****Bulbine caput-medusae* G.Will.****Status: EN B1B2ce**

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

*In very windy area that gets fog, summer and winter rain.****Bulbine francescae* G.Will. & Baijnath****Status: EN B1B2ce**

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

*Bulb difficult to get out because it grows in rock crevices.****Bulbine namaensis* Schinz****Status: VU D2**

Endemism: Endemic

Threats: Collection

Distribution: South-West-Central, South-West

***Trachyandra peculiaris* (Dinter) Oberm.****Status: VU D2**

Endemism: Endemic

Threats: Mining

Distribution: South-West

*Known from type specimen only.*

## ASTERACEAE

***Anisopappus pseudopinnatifidus* S.Ortiz & Paiva****Status: VU D2**

Endemism: Endemic

*Known from type specimen only.****Arctotis frutescens* Norl.****Status: VU D2**

Endemism: Endemic

Distribution: South-West

*In rock cracks.****Eremothamnus marlothianus* O.Hoffm.****Status: VU B1B2cC2a**

Endemism: Endemic

Threats: Mining

Distribution: South-West

*Monotypic Namibian endemic genus.****Eriocephalus klinghardtensis* M.A.N.Müller****Status: VU D2**

Endemism: Endemic

Threats: Mining  
Distribution: South-West  
*Restricted to one mountain, but is relatively common.*

***Euryaps mucasus* B.Nord.**

Status: EN B1B2cC2a  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West  
*Known from two collections only, not collected since 1973.*

***Euryaps walterorum* Merxm.**

Status: VU D2  
Endemism: Endemic  
Distribution: Central

***Felicia alba* Grau**

Status: EN B1B2c  
Endemism: Endemic  
Threats: Urban expansion  
Distribution: North-Central  
*Known from two collections only. Attractive when in flower.*

***Felicia gunillae* B.Nord.**

Status: VU D2  
Endemism: Endemic  
Distribution: North-West-Central  
*Known from type only collected in good rain year; scorched for, but not found since.*

***Gazania thermalis* Dinter**

Status: EN B1B2cdC2aD1  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Central to South-Central  
*Known from only three collections; not collected since 1980.*

***Lasiapagan panticulus* Hilliard**

Status: VU D2  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West

***Nidorella nordenstamii* Wild**

Status: VU D2  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: North-West-Central  
*Known from type only collected in good rain year, scorched for, but not found since.*

***Othonna clavifolia* Marloth**

Status: VU D2  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
*Dwarf pochoycol and very appealing.*

***Othanna cyclophylla* Merxm.**

Status: VU D2  
Endemism: Near-endemic  
Threats: Collection  
Distribution: South-East  
*On quartz ridge or dolerite, not collected since 1970s, known from two localities only.*

***Pentatrichia avasmantana* Merxm.**

Status: VU D2  
Endemism: Endemic  
Distribution: Central  
*Cushion-shaped shrub, hongs from rocks, vertical mountain wall.*

***Pentzia tomentosa* B.Nord.**

Status: VU D2  
Endemism: Endemic  
Distribution: North-West-Central  
*Known from type specimen only.*

***Pteronia spinulosa* E.Phillips**

Status: EN B1B2cdC2aD1

Endemism: Endemic  
Threats: Mining  
Distribution: South-West  
*All specimens collected along the coast, except one that needs verification.*

## CAMPANULACEAE

***Namacadan schinzianum* (Markgr.) Thulin**

Status: VU D1  
Endemism: Endemic  
Distribution: Central  
*Monotypic Namibion endemic genus.*

## CAPPARACEAE

***Cadaba termitaria* N.E.Br.**

Status: VU D2  
Distribution: East  
*Known from two collections only.*

## CHENOPODIACEAE

***Suaeda salina* B.Nord.**

Status: VU D2  
Endemism: Endemic  
Threats: Grazing/browsing  
Distribution: North-Central  
*Known from type specimen only.*

## CRASSULACEAE

***Crassula atropurpurea* (Haw.) D.Dietr. var.**

***cultiformis* (Friedrich) Toelken**  
Status: VU D2  
Endemism: Near-endemic  
Threats: Mining

***Crassula aurusbergensis* G.Will.**

Status: EN B1B2e  
Endemism: Endemic  
Threats: Collection, mining  
Distribution: South-West  
*On summit of mountains, needs fog. Sought after by collectors as it is a miniature.*

***Crassula ausensis* Hutchison subsp. *ausensis***

Status: VU B1B2c  
Endemism: Endemic  
Threats: Collection, mining  
Distribution: South-West  
*Prefers granite, sandstone or outcrops of quartzite.*

***Crassula ausensis* P.Hutchison subsp. *giessii* (Friedrich) Toelken**

Status: VU D2  
Endemism: Endemic  
Threats: Collection, mining  
Distribution: South-West-Central

***Crassula campestris* (Eckl. & Zeyh.) Endl. ex Walp.**

Status: VU D2  
Distribution: South-West  
*Known from one locality only. Plants are very small and may have been overlooked.*

***Crassula capitella* Thunb. subsp. *nadulasa* (Schonland) Toelken**

Status: VU D2  
Threats: Collection

***Crassula corallina* Thunb. subsp. *corallina***

Status: VU D2  
Distribution: South-West, South-East  
*Problematic in cultivation. Very limited distribution.*

***Crassula catyledanis* Thunb.**

Status: VU D2  
Threats: Collection  
Distribution: South-West

***Crassula elegans* Schonland & Baker f. subsp.**

***namibensis* (Friedrich) Toelken**  
Status: EN B1B2bc  
Endemism: Endemic  
Threats: Urban expansion, collection  
Distribution: South-West  
*On rocky slopes, often in exposed positions near coast.*

***Crassula expansa* Dryand. subsp. *pyrifolia* (Compton) Toelken**

Status: VU D2  
Endemism: Near-endemic  
Threats: Collection  
Distribution: South-West  
*In cultivation.*

***Crassula garibina* Marloth & Schonland subsp. *garibina***

Status: EN B1B2cd  
Endemism: Near-endemic  
Threats: Habitat degradation, mining, collection  
Distribution: South-West  
*Threatened by increasing human population along the river.*

***Crassula luederitzii* Schonland**

Status: VU D2  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West

***Crassula namaquensis* Schonland & Baker f. subsp. *namaquensis***

Status: VU D2  
Endemism: Near-endemic  
Distribution: South-West

***Crassula nemorosa* (Eckl. & Zeyh.) Endl. ex Walp.**

Status: VU D2  
Threats: Collection  
Distribution: South-West  
*One specimen collected in the 1970s only.*

***Crassula numaisensis* Friedrich**

Status: VU B1B2cdD1  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
*Known from type only, but considered to be a distinct taxon.*

***Crassula albanicalata* Schonland & Baker f.**

Status: VU D2  
Threats: Collection  
Distribution: South-West

***Crassula plegmataides* Friedrich**

Status: VU D2  
Endemism: Near-endemic  
Distribution: South-West

***Crassula pseudohemisphaerica* Friedrich**

Status: VU D2  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West

***Crassula rupestris* Thunb. subsp. *commutata* (Friedrich) Toelken**

Status: VU D2  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West

***Crassula thunbergiana* Schult. subsp. *minutiflora* (Schonland & Baker f.) Toelken**

Status: EN B1B2cC2a  
Endemism: Near-endemic  
Threats: Collection  
Distribution: South-West  
*Known from one collection in 1959, may be undercollected as it is a small prostrate fleshy herb.*



***Tylecodon aridimontanus* G.Will.**  
**Status: EN B1B2cd**  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
*Battered by sand-blasting winds.*

***Tylecodon aurusbergensis* G.Will. & van Jaarsv.**  
**Status: EN B1B2cd**  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
*Grows in rock cracks just below the south face of summit of inselberg.*

***Tylecodon buchholzianus* (Schuldt & Stephens) Toelken**  
**Status: VU D2**  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West

***Tylecodon hallii* (Toelken) Toelken**  
**Status: VU D2**  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
*Uncommon in collections. Plants are winter growing and therefore provide added interest during a time that most collections are dormant.*

***Tylecodon racemosus* (Harv.) Toelken**  
**Status: EN B1B2cd**  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
*Lower gravelly slopes or vertical cliff in ravine.*

***Tylecodon singularis* (R.A.Dyer) Toelken**  
**Status: EN B1B2cd**  
Endemism: Near-endemic  
Threats: Mining, urban expansion,  
Distribution: South-West

***Tylecodon walichii* (Harv.) Toelken subsp. ecklonianus (Harv.) Toelken**  
**Status: VU D2**  
Endemism: Near-endemic  
Distribution: South-West  
*Could be poisonous.*

CUCURBITACEAE

***Cucumella clavipetiolata* J.H.Kirkbr.**  
**Status: EN C2a**  
Endemism: Endemic  
Distribution: West-Central

CYPERACEAE

***Volkiella disticha* Merxm. & Czech**  
**Status: VU D2**  
Endemism: Near-endemic (D)  
Threats: Urban expansion  
Distribution: North-East  
*Annual sedge/herb, on river terrace.*

ERIOSPERMACEAE

***Eriospermum buchbergense* Dinter**  
**Status: VU D2**  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West  
*Known from type specimen only, a distinctive species, but lacks flowers and bulb.*

***Eriospermum citrinum* P.L.Perry**  
**Status: VU D2**  
Endemism: Endemic  
Distribution: Central

*Known from one location only on upper slopes.*

***Eriospermum flexum* P.L.Perry**  
**Status: VU D2**  
Endemism: Endemic  
Distribution: Central  
*Known from one collection only.*

***Eriospermum halenbergense* Dinter**  
**Status: VU D2**  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West  
*Coastal desert on sandy plain.*

***Eriospermum lavranosii* P.L.Perry**  
**Status: VU D2**  
Endemism: Endemic  
Distribution: Central

EUPHORBACEAE

***Euphorbia angrae* N.E.Br.**  
**Status: VU B1B2cd**  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West

***Euphorbia berotica* N.E.Br.**  
**Status: VU D2**  
Endemism: Near-endemic  
Threats: Collection  
*Known from one specimen only.*

***Euphorbia cibdela* N.E.Br.**  
**Status: VU D2**  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West

***Euphorbia eduardoi* L.C.Leach**  
**Status: VU D2**  
Endemism: Near-endemic  
Threats: Collection  
Distribution: North-West  
*No young individuals have been seen.*

***Euphorbia friedrichiae* Dinter**  
**Status: VU D2**  
Endemism: Endemic  
Threats: Grazing/browsing, collection  
Distribution: South-East  
*Not collected for 60 years.*

***Euphorbia herrei* A.C.White, R.A.Dyer & B.Sloane**  
**Status: EN A1cB2c**  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West

***Euphorbia kaokoensis* (A.C.White, R.A.Dyer & B.Sloane) L.C.Leach**  
**Status: VU D2**  
Endemism: Endemic  
Threats: Collection  
Distribution: North-West

***Euphorbia lavrani* L.C.Leach**  
**Status: CR B1B2cC2bD1**  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
*Known from type and one other specimen. Restricted to limestone and distribution may therefore be fragmented.*

***Euphorbia leistneri* R.H.Archer**  
**Status: EN B1B2cC2bD1**  
Endemism: Endemic  
Threats: Urban expansion, collection  
Distribution: North-West  
*Known from type only, but is in cultivation.*

***Euphorbia melanohydrata* Nel**  
**Status: VU A1c2cB1B2c**  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
*On sandy plains.*

***Euphorbia monteiroi* Hook.f. subsp. brandbergensis B.Nord.**  
**Status: VU D1D2**  
Endemism: Endemic  
Threats: Collection  
Distribution: North-West-Central

***Euphorbia namibensis* Marloth**  
**Status: VU B1B2ce**  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-East

***Euphorbia namuskluftensis* L.C.Leach**  
**Status: CR D1**  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
*Limestone outcrop only, not found during field work.*

***Euphorbia otjipembana* L.C.Leach**  
**Status: EN D1**  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: North-West  
*Not collected for 27 years, stony slopes; distribution may therefore be fragmented.*

***Euphorbia subsalsa* Hiern subsp. fluvialis L.C.Leach**  
**Status: VU D2**  
Endemism: Near-endemic  
Threats: Urban expansion, collection  
*Restricted to rocky sites on both banks of the Kunene River.*

***Euphorbia verruculosa* N.E.Br.**  
**Status: VU A1c2cB1B2c**  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West

FABACEAE

***Baikiaea plurijuga* Harms**  
**Status: VU A1bcd2bcd**  
Threats: Urban expansion, grazing/browsing, fire, agriculture  
Distribution: North-Central, East  
*Commercially logged for over 50 years. Young trees destroyed by fire. Valuable timber.*

***Caesalpinia merxmuellerana* A.Schreib.**  
**Status: VU D1**  
Endemism: Endemic  
Distribution: South-Central  
*Probably undercollected; in very inaccessible areas.*

***Decorsea dinteri* (Harms) Verdc.**  
**Status: VU D2**  
Endemism: Endemic  
Threats: Harvesting  
Distribution: Central  
*Known from type specimen only.*

***Elephantorrhiza rangei* Harms**  
**Status: EN B1B2cdD1**  
Endemism: Endemic  
Threats: Habitat degradation, road network  
Distribution: South-West-Central  
*Very limited distribution.*

***Eriosema harmsiana* Dinter**  
**Status: VU D2**  
Endemism: Endemic  
Threats: Harvesting

Distribution: Central  
Known from type only, collected in 1930s.

***Lebeckia dinteri* Harms**  
Status: VU D2  
Endemism: Endemic  
Distribution: South-West

***Lotononis mirabilis* Dinter**  
Status: VU D2  
Endemism: Endemic  
Distribution: South-West  
Known from type and two specimens only, not collected since 1920s.

***Lotononis pachycarpa* Dinter ex B.-E.van Wyk**  
Status: VU D2  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West

***Pterocarpus angolensis* DC.**  
Status: VU A1bcd2bcd  
Threats: Urban expansion, fire, agriculture  
Distribution: North-Central  
One of the most valuable woods.

## HYACINTHACEAE

***Bowiea gariensis* van Jaarsv.**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: South-West  
Limited distribution.

***Lachenalia buchbergensis* Dinter**  
Status: VU D2  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
May be undercollected because it is small and timing for collecting must be right.

***Lachenalia klinghardtiana* Dinter**  
Status: VU D2  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West

***Lachenalia namibiensis* W.F.Barker**  
Status: VU D2  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
Plants in cultivation are twice the size of the wild ones.

***Lachenalia nordenstamii* W.F.Barker**  
Status: VU D2  
Endemism: Near-endemic  
Threats: Mining, collection  
In sheltered rock cracks.

***Lachenalia nutans* G.D.Duncan**  
Status: VU D2  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
Known from two collections only.

***Ornithogalum deltoideum* Baker**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: South-East  
Collected in 1923 only.

***Ornithogalum geniculatum* Oberm.**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: South-West

***Ornithogalum merxmülleri* Roessler**  
Status: VU D2  
Endemism: Endemic

Distribution: South-West  
Known from type only.

***Ornithogalum puberulum* Oberm.**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: South-West  
In crevices of overhanging reefs, near summit.

***Rhadamanthus fasciatus* B.Nord.**  
Status: VU D2  
Threats: Mining  
Distribution: North-East  
Only collected in 1965, in white quartz stone near a mine.

***Rhadamanthus namibensis* Oberm.**  
Status: VU D1D2  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: South-West

***Rhadamanthus secundus* B.Nord.**  
Status: VU D2  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West

## IRIDACEAE

***Babiana longicollis* Dinter**  
Status: VU D2  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
Known from type only.

***Ferraria schaeferi* Dinter**  
Status: VU B1B2cd  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
Fewer than ten locations, sparsely distributed.

***Moraea garipensis* Goldblatt**  
Status: EN B1B2cdD1  
Endemism: Endemic  
Threats: Urban expansion, collection  
Distribution: South-West  
Grows in cracks in granitic rocky outcrops above river—o most unexpected locality for o *Moraea*, let alone on unspecialised one. Least specialised species in the genus. It has no obvious adaptations for drought resistance. Large yellow flowers.

***Moraea graniticola* Goldblatt**  
Status: EN B1B2cdD1  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
Known from o single collection, probably occurs elsewhere. Of collector's interest. As it occurs in townlands which could be over-used, e.g. wood collecting, grazing, it is probably threatened.

***Moraea hexaglottis* Goldblatt**  
Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
Known from several sites on o single form, but may be more widespread on the Huib Plateau.

***Moraea namibensis* Goldblatt**  
Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
Winter rainfall, sandy flats amongst low scattered bushes and small annuals; previously misidentified, so may be found to be more widespread when area is more botanically explored.

## KIRKIAACEAE

***Kirkia dewinteri* Merxm. & Heine**  
Status: VU D2  
Endemism: Endemic  
Threats: Habitat destruction  
Distribution: North-West to South-West-Central

## LAMIACEAE

***Plectranthus unguentarius* Codd**  
Status: EN B1B2e  
Endemism: Endemic  
Distribution: North-West  
Used traditionally. Not collected since 1960, although it is an erect, robust semi-succulent suffrutescent.

## LOBELIACEAE

***Lobelia hereroensis* Schinz**  
Status: VU D2  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Central, North-West-Central  
Could be so small and hidden in moss that it is overlooked. Distribution of similar habitats is limited and subject to drying out or over-use when water is scarce.

## MESEMBRYANTHEACEAE

***Amphibolia obscura* H.E.K.Hartmann**  
Status: VU B1B2c  
Threats: Mining, collection  
Distribution: South-West  
Seems to be restricted to hills in small area.

***Antimima argentea* (L.Bolus) H.E.K.Hartmann**  
Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
Known from one population only. Very attractive flowers.

***Antimima aurasensis* H.E.K.Hartmann**  
Status: VU D2  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
Known from limited area only.

***Antimima buchbergensis* (Dinter) H.E.K.Hartmann**  
Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
Known from one locality only.

***Antimima eendornensis* (Dinter) H.E.K.Hartmann**  
Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: South-East

***Antimima modesta* (L.Bolus) H.E.K.Hartmann**  
Status: VU B1B2c  
Endemism: Endemic  
Threats: Mining, grazing/browsing, collection  
Distribution: South-East  
Restricted distribution.

***Antimima quartzitica* (Dinter) H.E.K.Hartmann**  
Status: VU B1B2c  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South-West  
Restricted distribution.



**Astridia citrino** (L.Bolus) L.Bolus  
**Status:** VU B1B2c  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Restricted to rocky places only (koppies and inselbergs).*

**Astridio hollii** L.Bolus  
**Status:** VU B1B2c  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Grows on rocky inselbergs and koppies.*

**Astridio longifolio** (L.Bolus) L.Bolus  
**Status:** VU B1B2c  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Very pretty red flower. The most common species in the genus.*

**Astridia specioso** L.Bolus  
**Status:** EN B1B2c  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Exceptionally pretty red flower. Restricted distribution.*

**Astridio velutino** Dinter & Schwantes  
**Status:** VU B1B2abcdeC1C2a  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*One population at a mine is probably destroyed by now.*

**Brownonthus nomibensis** (Marloth) Bullock  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Mining  
 Distribution: South-West  
*Habitat limited (along coast).*

**Brownonthus pubescens** (N.E.Br. ex C.A.Maas) Bullock  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Mining  
 Distribution: South-West  
*Dwarf shrub with very striking appearance.*

**Cephalophyllum compressum** L.Bolus  
**Status:** VU B1B2ce  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Restricted distribution.*

**Cephalophyllum confusum** (Dinter) Dinter & Schwantes  
**Status:** VU B1B2bcdeC2a  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Mountains and inselbergs. One subpopulation at a mine is probably destroyed by now.*

**Cephalophyllum herrei** L.Bolus  
**Status:** VU C2a  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

**Chosmotophyllum musculinum** (Haw.) Dinter & Schwantes  
**Status:** VU C2a  
 Threats: Collection  
 Distribution: South-East  
*Very attractive plant with pretty flower, easy to propagate.*

**Conophytum ongelicae** (Dinter & Schwantes) N.E.Br. subsp. *ongelicoe*  
**Status:** CR C2a  
 Threats: Mining, agriculture, collection

Distribution: South-East  
*In the past 30 years only five plants have been recorded.*

**Conophytum friedrichoe** (Dinter) Schwantes  
**Status:** EN B1B2ceC2a  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-East  
*Limited distribution.*

**Conophytum grotum** (N.E.Br.) N.E.Br. subsp. *grotum*  
**Status:** EN B1B2ceC2a  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-West  
*Hos a wide range.*

**Conophytum hollenbergense** (Dinter & Schwantes) N.E.Br.  
**Status:** EN C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West  
*Shows amazing resemblance to the Schloffkuppe form of C. taylorianum subsp. ernianum.*

**Conophytum klinghordtense** Rawe subsp. *borodii* (Rawe) S.A.Hammer  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West

**Conophytum klinghordtense** Rawe subsp. *klinghardtense*  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West  
*Known from only one location.*

**Conophytum loeschionum** Tischer  
**Status:** EN B1B2ceC2a  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-West

**Conophytum moughonii** N.E.Br. subsp. *moughonii*  
**Status:** VU D2  
 Threats: Collection  
 Distribution: South-East  
*Plants are cryptic most of the year, therefore it could be more widespread.*

**Conophytum pageae** (N.E.Br.) N.E.Br.  
**Status:** VU C2a  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Pretty flower, common in cultivation.*

**Conophytum quoesitum** (N.E.Br.) N.E.Br. subsp. *densipunctum* (L.Bolus) S.A.Hammer  
**Status:** EN B1B2e  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East  
*Common in cultivation.*

**Conophytum quoesitum** (N.E.Br.) N.E.Br. subsp. *quoesitum* var. *rostratum* (Tischer) S.A.Hammer  
**Status:** EN B1B2ceC2a  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-West  
*Often grows on steep faces and in deep narrow crevices.*

**Conophytum quoesitum** (N.E.Br.) N.E.Br. subsp. *quoesitum* var. *quoesitum*  
**Status:** EN B1B2e  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

**Conophytum ricardionum** Loesch & Tischer subsp. *ricardianum*  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West, South-Central  
*Known with certainty from only one location. Not easily cultivated.*

**Conophytum soxetanum** (N.E.Br.) N.E.Br.  
**Status:** VU B1B2ceC2a  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

**Conophytum taylorianum** (Dinter & Schwantes) N.E.Br. subsp. *ernionum* (Loesch & Tischer) de Boer ex S.A.Hammer  
**Status:** VU B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West

**Conophytum taylorianum** (Dinter & Schwantes) N.E.Br. subsp. *taylorianum*  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West  
*Known from one locality only.*

**Dracophilus montis-draconis** (Dinter) Dinter & Schwantes  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: Karas  
*In many localities, but limited area.*

**Eberlonzio schneideriana** (A.Berger) H.E.K.Hartmann  
**Status:** VU B1B2ce  
 Endemism: Endemic?  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

**Fenestraria rhopalophyllo** (Schltr. & Diels) N.E.Br. subsp. *ourantioco* (N.E.Br.) H.E.K.Hartmann  
**Status:** EN C1C2a  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Severely threatened by mining, one population already damaged by road building.*

**Fenestraria rhopalophyllo** (Schltr. & Diels) N.E.Br. subsp. *rhopalophylla*  
**Status:** VU A1aC1C2a  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Road building and prospecting have already damaged some populations.*

**Hortmonthus hollii** (L.Bolus) S.A.Hammer  
**Status:** EN B1B2e  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Desirable horticultural subject.*

**Hortmonthus pergomentoceus** (L.Bolus) S.A.Hammer  
**Status:** VU B1B2ceC2a  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Vast colonies occur in one area.*

**Jensenobotrya lossowiana** A.G.J.Herre  
**Status:** EN B1B2ce  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West-Central  
*Very pretty flower, unusual plant.*

*Juttadinteria deserticola* (Marloth) Schwantes  
**Status:** VU B1B2ce  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

*Juttadinteria kovismontana* (Dinter) Schwantes  
**Status:** EN B1B2ce  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

*Juttadinteria simpsonii* (Dinter) Schwantes  
**Status:** EN B1B2ce  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

*Juttadinteria suavissima* (Dinter) Schwantes  
**Status:** VU B1B2ceC2a  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West

*Lithops dinteri* Schwantes subsp. *dinteri* var. *dinteri*  
**Status:** VU B1B2ce  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East  
*Probably in cultivation.*

*Lithops dinteri* Schwantes subsp. *multipunctata* (de Boer) D.T.Cole  
**Status:** EN B1B2ce  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East  
*Probably in cultivation.*

*Lithops francisci* (Dinter & Schwantes) N.E.Br.  
**Status:** EN B1B2c  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West  
*Known from limited areo only, probably in cultivation.*

*Lithops fulviceps* (N.E.Br.) N.E.Br. var. *lactinea* D.T.Cole  
**Status:** EN C2b  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-Central  
*Probably in cultivation.*

*Lithops fulviceps* (N.E.Br.) N.E.Br. var. *fulviceps*  
**Status:** VU C2a  
 Threats: Collection  
 Distribution: South-East  
*Known from restricted distribution only.*

*Lithops gesineae* de Boer var. *gesinae*  
**Status:** EN B1B2e  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West  
*Only known from two localities, probably in cultivation.*

*Lithops gesineae* de Boer var. *annae* (de Boer) D.T.Cole  
**Status:** EN B1B2e  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-Central  
*Only known from two localities, probably in cultivation.*

*Lithops gracilidelineaata* Dinter subsp. *brandbergensis* (de Boer) D.T.Cole  
**Status:** EN B1B2e  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: North-West-Central  
*Occurs on the top of the mountain, the greatest altitude yet recorded for a *Lithops* habitat.*

*Lithops gracilidelineaata* Dinter subsp. *gracilidelineaata* var. *gracilidelineaata*  
**Status:** VU C2a  
 Threats: Collection  
 Distribution: North-West-Central  
*Probably in cultivation.*

*Lithops gracilidelineaata* Dinter subsp. *waldraniae* de Boer  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West-Central

*Lithops hermetica* D.T.Cole  
**Status:** CR A1dB1B2e  
 Endemism: Endemic  
 Threats: Collection, mining  
 Distribution: South-West  
*The species name, meaning 'hermetically sealed', refers to the diamond areo where plants are considered reasonably safe. It was no doubt applied in irony as the taxon's author is very concerned about ongoing illegal collecting in the areo.*

*Lithops herrei* L.Bolus  
**Status:** EN B1B2ceC2a  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-West

*Lithops julii* (Dinter & Schwantes) N.E.Br. subsp. *fulleri* (N.E.Br.) Fearn var. *rouxii* (de Boer) D.T.Cole  
**Status:** EN C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East  
*Probably in cultivation.*

*Lithops julii* (Dinter & Schwantes) N.E.Br. subsp. *julii*  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East  
*Probably in cultivation.*

*Lithops karasmontana* (Dinter & Schwantes) N.E.Br. subsp. *bella* (N.E.Br.) D.T.Cole  
**Status:** EN C2a  
 Endemism: Endemic  
 Threats: Collection

*Lithops karasmontana* (Dinter & Schwantes) N.E.Br. subsp. *eberlanzii* (Dinter & Schwantes) D.T.Cole  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West

*Lithops karasmantana* (Dinter & Schwantes) N.E.Br. subsp. *karasmantana* var. *aiaisensis* (de Boer) D.T.Cole  
**Status:** EN B1B2e  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West  
*Known from restricted distribution only.*

*Lithops karasmontana* (Dinter & Schwantes) N.E.Br. subsp. *karasmontana* var. *karasmantana*  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East

*Lithops karasmontana* (Dinter & Schwantes) N.E.Br. subsp. *karasmontana* var. *lericheana* (Dinter & Schwantes) D.T.Cole  
**Status:** EN B1B2e  
 Endemism: Endemic

Threats: Collection  
 Distribution: South-East

*Lithops karasmantana* (Dinter & Schwantes) N.E.Br. subsp. *karasmantana* var. *tischeri* D.T.Cole  
**Status:** EN B1B2ceC2ab  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East  
*Known from one locality only.*

*Lithops pseudotruncatella* (A.Berger) N.E.Br. subsp. *archaeae* (de Boer) D.T.Cole  
**Status:** VU D1D2  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West-Central  
*Known from restricted distribution only.*

*Lithops pseudatruncatella* (A.Berger) N.E.Br. subsp. *dentritica* (Nel) D.T.Cole  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: Central  
*Known from restricted distribution only.*

*Lithops pseudatruncatella* (A.Berger) N.E.Br. subsp. *groendrayensis* (H.Jacobsen) D.T.Cole  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: Central  
*Known from restricted distribution only.*

*Lithops pseudatruncatella* (A.Berger) N.E.Br. subsp. *pseudatruncatella* (A.Berger) N.E.Br. var. *elisabethiae* (Dinter) de Boer & Boom  
**Status:** EN B1B2ceC2ab  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: Central  
*Known from one locality only.*

*Lithops pseudatruncatella* (A.Berger) N.E.Br. subsp. *pseudotruncatella* (A.Berger) N.E.Br. var. *riehmerae* D.T.Cole  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: Central  
*Known from restricted distribution only.*

*Lithops pseudotruncatella* (A.Berger) N.E.Br. subsp. *valkii* (Schwantes ex de Boer & Boom) D.T.Cole  
**Status:** EN B1B2ceC2abD1  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: Central

*Lithops ruschiarum* (Dinter & Schwantes) N.E.Br. var. *ruschiorum*  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: North-West-Central

*Lithops ruschiarum* (Dinter & Schwantes) N.E.Br. var. *lineata* (Nel) D.T.Cole  
**Status:** VU B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: North-West-Central

*Lithops schwantesii* Dinter subsp. *gebseri* (de Boer) D.T.Cole  
**Status:** EN B1B2ceC2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-Central  
*Known from restricted distribution only.*



*Lithops schwantesii* Dinter subsp. *schwantesii* var. *urikosensis* (Dinter) de Boer & Boom  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-Central

*Lithops schwantesii* Dinter subsp. *schwantesii* var. *marthae* (Loesch & Tischer) D.T.Cole  
**Status:** EN C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West

*Lithops schwantesii* Dinter subsp. *schwantesii* var. *schwantesii*  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-Central

*Lithops schwantesii* Dinter subsp. *schwantesii* var. *rugosa* (Dinter) de Boer & Boom  
**Status:** CR C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-Central

*Lithops vallis-mariae* (Dinter & Schwantes) N.E.Br.  
**Status:** VU C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-Central, East-Central

*Lithops wernerii* Schwantes ex H.Jacobsen  
**Status:** CR B1B2eC2b  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: North-West-Central  
*Known from one locality only.*

*Namibia cinerea* (Marloth) Schwantes  
**Status:** EN B1B2e  
 Endemism: Endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*Common in extremely restricted areas.*

*Nananthus aloides* (Haw.) Schwantes  
**Status:** EN B1B2ce  
 Threats: agriculture, collection  
 Distribution: East-Central  
*From limestone/calcrete pan areas. Very attractive plant and flower. Undercollected.*

*Nananthus margaritifera* L.Bolus  
**Status:** EN B1B2ce  
 Threats: agriculture, collection  
 Distribution: East-Central  
*Limestone/calcrete pan areas, probably only a few subpopulations.*

*Psammophora nissenii* (Dinter) Dinter & Schwantes  
**Status:** VU B1B2ce  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South  
*Very attractive plant.*

*Psammophora saxicola* H.E.K.Hartmann  
**Status:** EN B1B2ce  
 Endemism: Near-endemic  
 Threats: Habitat degradation, mining, collection  
 Distribution: South-West  
*There are apparently several large well-established subpopulations.*

*Ruschianthemum gigas* (Dinter) Friedrich  
**Status:** VU C2a  
 Endemism: Endemic?  
 Threats: Habitat degradation, mining, collection

Distribution: South-West  
*Occurs in mauntain areos, not sondy plains.*

*Schwantesia constanceae* N.Zimm.  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Collection

## MOLLUGINACEAE

*Suessenguthiella caespitosa* Friedrich  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: South-West  
*Known from type ond one specimen only; not collected since 1929. Probably overlooked as it is very small.*

## ORCHIDACEAE

*Ansellia africana* Lindl.  
**Status:** VU B1B2e  
 Threats: Collection  
 Distribution: North-West, North-East  
*Medicinal properties. Pretty flowers. Not collected since 1976.*

*Bartholina ethelae* Bolus  
**Status:** VU D2  
 Threats: Collection  
 Distribution: South-West  
*Rare or localised.*

*Bonatea steudneri* (Rchb. f.) T.Durand & Schinz  
**Status:** CR B1B2ce  
 Threats: Urban expansion, collection  
 Distribution: Caprivi  
*Pretty flowers. Not collected since 1979. Pesticides may be cousing loss of pollinators.*

*Eulophia hereroensis* Schltr.  
**Status:** EN D1  
 Threats: Collection  
 Distribution: North-Central  
*Last collected in 1984, appears to be restricted to a few small colonies of up to 20 plants. Has ethnobotanical use.*

*Eulophia leachii* Greatrex ex A.V.Hall  
**Status:** VU B1B2ceD1D2  
 Threats: Urban expansion, collection  
 Distribution: North-Central, East  
*Attractive flowers. May form large colonies. Last collected in 1976.*

*Eulophia livingstoniana* (Rchb.f.) Summerh.  
**Status:** EN B1B2ce  
 Threats: Urban expansion, collection  
 Distribution: North-East  
*Very pretty flowers. Last collected in 1963. Occurs in forests ond along river.*

*Eulophia walleri* Kraenzl.  
**Status:** VU B1B2ce  
 Threats: Fire, collection  
 Distribution: Caprivi  
*Attractive flower. Occasionally in toll grassland.*

*Habenaria epipactidea* Rchb.f.  
**Status:** VU C2a  
 Threats: Collection  
 Distribution: North-Central, North-East

*Holothrix filicornis* Immelman & Schelpe  
**Status:** EN B1B2ceD1  
 Endemism: Near-endemic  
 Threats: Mining, urban expansion, collection  
 Distribution: South-West

## OXALIDACEAE

*Oxalis ausensis* R.Knuth  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Mining  
 Distribution: South-West  
*Known from type (1922) and one specimen (1976). Probably undercollected, as it favours good years.*

*Oxalis luederitzii* Schinz  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: South-West

*Oxalis schaeferi* R.Knuth  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: South-West  
*Not collected since the 1920s.*

## PASSIFLORACEAE

*Adenia pechuelii* (Engl.) Harms  
**Status:** EN C1C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: North-West, Caprivi  
*Seeds well in captivity.*

## PEDALIACEAE

*Sesamothamnus leistneri* ined. De Winter & Leistner 5504  
**Status:** EN D1  
 Endemism: Endemic  
 Distribution: North-West

## PLUMBAGINACEAE

*Plumbago wissii* Friedrich  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: North-West-Central

## RUTACEAE

*Anginon streyi* (Merxm.) Allison & B.-E.van Wyk  
**Status:** VU D2  
 Endemism: Endemic

## SCROPHULARIACEAE

*Chamaegigas intrepidus* Dinter  
**Status:** EN C2a  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-West-Central  
*Seasonal, submerged plant in granite outcrops. Collected because is considered a "resurrection" plant.*

*Diclis tenuissima* Pilg.  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: South-West-Central  
*Very small, delicate plants; occur in moss in damp areos. May be undercollected because misidentified. Not collected since 1978.*

*Dintera pterocaulis* Stapf  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Central  
*Known from type only, nat collected since 1920s. Monospecific Nnmibian endemic genus.*

*Nemesia karasbergensis* L.Bolus  
Status: VU D2  
Endemism: Endemic  
Distribution: South-East  
Known from type only, collected in 1913.

*Nemesia violiflora* Roessler  
Status: VU D2  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West

## SELAGINACEAE

*Cromidon pusillum* (Roessler) Hilliard  
Status: VU D2  
Endemism: Endemic  
Distribution: North-East  
Known from one collection in 1939 only.

*Selago lepida* Hilliard  
Status: VU D2  
Endemism: Endemic  
Threats: Grazing/browsing  
Distribution: North-West-Central, South-East  
Previously confused with *S. albida*. Pretty and not common.

*Selago nactigalii* Rolfe  
Status: VU D2  
Endemism: Endemic  
Threats: Grazing/browsing  
Distribution: South-West, South-Central

## SOLANACEAE

*Nicotiana africana* Merxm.  
Status: VU D1D2  
Endemism: Endemic  
Threats: Pests/diseases  
Distribution: North-West-Central  
Occurs on granite outcrops or inselbergs. No juveniles seen, seeds have been used in the USA and South Africa for possible improvement of tobacco. Plants have been grown from seed.

## STERCULIACEAE

*Dombeya rotundifolia* (Hochst.) Planch. var. *velutina* I.Verd.  
Status: VU D2  
Endemism: Endemic

## ULMACEAE

*Trema orientalis* (L.) Blume  
Status: VU D2  
Distribution: North-West-Central  
Very limited distribution.

## VERBENACEAE

*Priva auricoccea* A.Meeuse  
Status: VU D2  
Endemism: Endemic  
Distribution: North-West  
Known from type only.

## VITACEAE

*Cyphostemma bainesii* (Hook.f.) Desc.  
Status: VU C2a  
Endemism: Endemic  
Threats: Collection, harvested  
Distribution: North  
Fruits eaten.

*Cyphostemma juttae* (Dinter & Gilg) Desc.  
Status: VU B1B2ceC2a  
Endemism: Endemic  
Threats: Collection, habitat degradation  
Distribution: North-Central  
Live plants or seed exchanged. Stem sop poisonous. Has ethnobotanical use.

## ZYGOPHYLLACEAE

*Neoluederitzia sericeocarpa* Schinz  
Status: VU D2  
Endemism: Endemic  
Distribution: South-Central

*Zygophyllum giessii* Merxm. A.Schreib.  
Status: VU D2  
Endemism: Endemic  
Threats: Grazing/browsing  
Distribution: South-West  
Juveniles and seedlings occur. Grazing damage occurs.

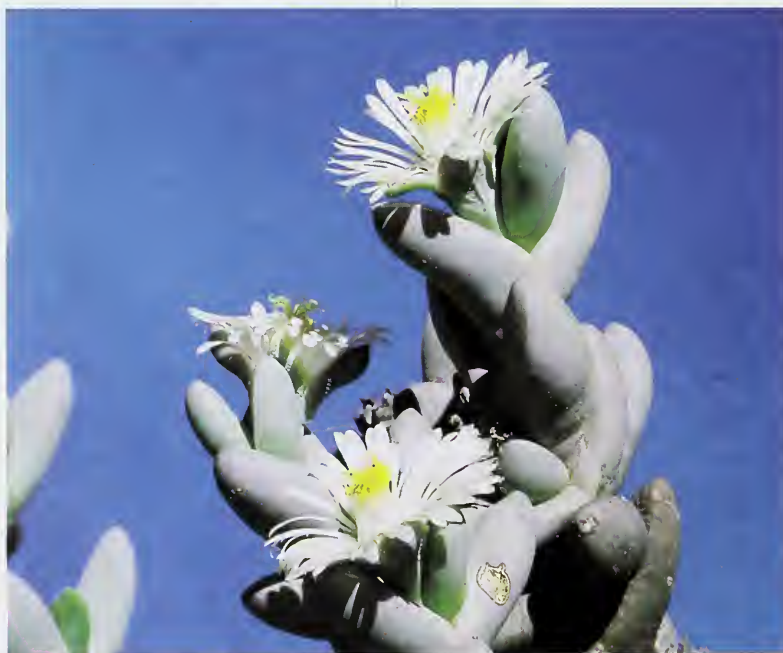
*Zygophyllum inflatum* Van Zyl  
Status: VU D2  
Endemism: Near-endemic  
Distribution: North-West  
Only three specimens seen with abundant seeds.

*Zygophyllum macrocarpon* Retief  
Status: VU D2  
Endemism: Near-endemic  
Distribution: South-West  
Subpopulations are few and small, but seeds are numerous. Weekly grazed.

*Zygophyllum pterocaula* Van Zyl  
Status: VU D2  
Endemism: Near-endemic  
Threats: Urban expansion  
Distribution: South-Central  
Not grazed.

*Zygophyllum schreiberianum* Merxm. & Giess  
Status: VU D2  
Endemism: Near-endemic  
Distribution: South-West  
One large subpopulation. Usually occasional. Scattered individuals, juveniles and seedlings seen.

*Zygophyllum segmentatum* Van Zyl ined.  
Status: VU D2  
Endemism: Near-endemic  
Threats: Mining, urban expansion  
Distribution: South-West  
Young plants seen.



The erect form of *Juttadinteria deserticola*. (Photo: G. Williamson)



One of the few Namibian orchids, *Eulophia leachii*. (Photo: C. Hines)



# LOWER RISK

## ACANTHACEAE

*Barleria lanceolata* (Schinz) Oberm.

Status: LR-lc  
Endemism: Endemic  
Distribution: wide

*Barleria mackenii* Hook.f.

Status: LR-lc

*Barleria macrostegia* Nees

Status: LR-lc

*Barleria rigida* Willd. ex Nees

Status: LR-lc

*Barleria senensis* Klotzsch

Status: LR-lc

*Barleria solitaria* P.G.Mey.

Status: LR-lc  
Endemism: Endemic  
Distribution: North-West-Central

*Blepharis diversispina* (Nees) C.B.Clarke

Status: LR-lc

*Blepharis furcata* (L.f.) Pers.

Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-West

*Blepharis gigantea* Oberm.

Status: LR-lc  
Endemism: Endemic  
Distribution: South-West-Central

*Blepharis grossa* (Nees) T.Anderson

Status: LR-lc  
Endemism: Near-endemic  
Distribution: wide

*Blepharis integrifolia* (L.f.) E.Mey. ex Schinz var.

*integrifolia*  
Status: LR-lc

*Blepharis leendertziae* Oberm.

Status: LR-lc

*Blepharis maderaspatensis* (L.) Heyne ex Roth

Status: LR-lc

*Blepharis mitrata* C.B.Clarke

Status: LR-lc

*Blepharis obmitrata* C.B.Clarke

Status: LR-lc  
Distribution: wide

*Blepharis pruinosa* Engl.

Status: LR-lc  
Endemism: Endemic  
Distribution: South-West-Central, Central  
*Fairly widespread.*

*Blepharis tenuiramea* S.Moore

Status: LR-lc  
Distribution: North-East

*Justicia guerkeana* Schinz

Status: LR-lc  
Endemism: Endemic  
Distribution: South

*Justicia platysepala* (S.Moore) P.G.Mey.

Status: LR-lc  
Endemism: Endemic  
Distribution: wide

*Megalochlamys marlothii* (Engl.) Lindau

Status: LR-lc  
Endemism: Near-endemic  
Distribution: wide

*Monechma cleomoides* (S.Moore) C.B.Clarke

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West to South-West-Central

*Monechma desertorum* (Engl.) C.B.Clarke

Status: LR-lc  
Endemism: Endemic  
Distribution: Central to South

*Monechma genistifolium* (Engl.) C.B.Clarke subsp.

*australe* (P.G.Mey.) Munday  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-Central

*Monechma genistifolium* (Engl.) C.B.Clarke subsp.

*genistifolium*  
Status: LR-lc  
Distribution: Central

*Monechma grandiflorum* Schinz

Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Monechma mollissimum* (Nees) P.G.Mey.

Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-West

*Monechma salsola* (S.Moore) C.B.Clarke

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North

*Monechma tonsum* P.G.Mey.

Status: LR-lc  
Endemism: Endemic  
Distribution: North-West, North-Central

*Peristrophe grandibracteata* Lindau

Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Peristrophe hereroensis* (Schinz) K.Balkwill

Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Peristrophe namibensis* K.Balkwill subsp.

*brandbergensis* K.Balkwill  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West-Central

*Peristrophe namibensis* K.Balkwill subsp.

*namibensis*  
Status: LR-lc  
Endemism: Endemic  
Distribution: South-West-Central

*Petalidium angustitubum* P.G.Mey.

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Petalidium bracteatum* Oberm.

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Petalidium canescens* (Engl.) C.B.Clarke

Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Petalidium cirrhiferum* S.Moore

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Petalidium coccineum* S.Moore

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Petalidium crispum* A.Meeuse ex P.G.Mey.

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Petalidium cymbiforme* Schinz

Status: LR-lc  
Endemism: Endemic  
Distribution: South-West, South-Central

*Petalidium engleranum* (Schinz) C.B.Clarke

Status: LR-lc

*Petalidium giessii* P.G.Mey.

Status: LR-lc  
Endemism: Endemic  
Distribution: North-West

*Petalidium halimoides* (Nees) S.Moore

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Petalidium lanatum* (Engl.) C.B.Clarke

Status: LR-lc  
Distribution: West-Central

*Petalidium linifolium* T.Anderson

Status: LR-lc  
Endemism: Endemic  
Distribution: South-West-Central, South-Central

*Petalidium lucens* Oberm.

Status: LR-lc  
Endemism: Near-endemic  
Distribution: South

*Petalidium luteo-album* A.Meeuse

Status: LR-lc  
Endemism: Endemic  
Distribution: North-West, West-Central

*Petalidium pilosi-bracteolatum* Merxm. & Hainz

Status: LR-lc  
Endemism: Endemic  
Distribution: North to Central

*Petalidium ramulosum* Schinz

Status: LR-lc  
Endemism: Endemic  
Distribution: North-Central

*Petalidium rossmannianum* P.G.Mey.

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West, West-Central

*Petalidium setosum* C.B.Clarke ex Schinz

Status: LR-lc  
Endemism: Near-endemic

*Petalidium variable* (Engl.) C.B.Clarke

Status: LR-lc

Endemism: Near-endemic

Distribution: wide

*Ruellia aspera* (Schinz) Phillips

Status: LR-lc

Endemism: Endemic

Distribution: South-Central

*Ruellia brandbergensis* Kers

Status: LR-nt

Endemism: Endemic

Distribution: North-West-Central

*Ruellia diversifolia* S.Moore

Status: LR-lc

## AIZOACEAE

*Aizaantheum dinteri* (Schinz) Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

*Aizaantheum galenioides* (Fenzl ex Sond.)

Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

*Rore on sond near the coast in central Nomib.*

*Aizaantheum membrum-cannectens* Dinter ex

Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

*On sond generally near the coast.*

*Aizaan giessii* Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: Central

*Galenia africana* L.

Status: LR-lc

*Galenia papulosa* (Eckl. & Zeyh.) Sond.

Status: LR-lc

*Tetragonia schenkii* (Schinz) Engl.

Status: LR-lc

Endemism: Endemic

Distribution: South

*Trianthema hereroensis* Schinz

Status: LR-lc

Endemism: Endemic

Distribution: South-West-Central

*Tribulocarpus dimorphanthus* (Pax) S.Moore

Status: LR-lc

Endemism: Near-endemic

## AMARANTHACEAE

*Arthraerua leubnitziae* (Kuntze) Schinz

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central, North-West

*Calicorema squarrasa* (Schinz) Schinz

Status: LR-lc

Endemism: Endemic

Distribution: South

*Hermstaedtia argenteifarmis* Schinz

Status: LR-lc

Endemism: Near-endemic

Distribution: wide

*Hermstaedtia spathulifolia* (Engl.) Baker

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

*Leucasphaera bainesii* (Hook.f.) Gilg

Status: LR-lc

*Marcelliopsis denudata* (Hook.f.) Schinz

Status: LR-lc

Endemism: Near-endemic

*Marcelliopsis splendens* (Schinz) Schinz

Status: LR-lc

Endemism: Endemic

Distribution: Central

*Marcelliopsis welwitschii* (Hook.f.) Schinz

Status: LR-lc

Endemism: Near-endemic

*Sericacama heterachiton* Lopr.

Status: LR-lc

## AMARYLLIDACEAE

*Ammacharis nerinaides* (Baker) Lehmillier

Status: LR-nt

Endemism: Endemic

Threats: Collection

Distribution: North-East, East-Central

*Perhaps undercollected.*

*Boaphane disticha* (L.f.) Herb.

Status: LR-lc

*Haemanthus coccineus* L.

Status: LR-lc

Distribution: South-West

*Nerine laticama* (Ker Gawl.) T.Durand & Schinz

Status: LR-lc

## ANACARDIACEAE

*Ozaraa cancal* (C.Presl. ex Sond.) De Winter

Status: LR-lc

Endemism: Near-endemic

Distribution: South

*Ozaraa dispar* (C.Presl.) R.R. & A.Fern.

Status: LR-lc

Distribution: South-Central, South-East

*Ozaraa langipes* (Engl. & Gilg) R.R. & A.Fern.

Status: LR-lc

Distribution: North-East

*Hos ethnobotanical use.*

*Ozaraa namaensis* (Schinz & Dinter) R.Fern.

Status: LR-lc

Endemism: Near-endemic

*Ozaraa schinzii* (Engl.) R.R. & A.Fern.

Status: LR-lc

Endemism: Near-endemic

Distribution: North

*Rhus prolematoides* Merxm. & Roessler

Status: LR-lc

Endemism: Endemic

Distribution: South-West-Central

## ANNONACEAE

*Friesadielsia obovata* (Benth.) Verdc.

Status: LR-lc

*Hexalobus monopetalus* (A.Rich.) Engl. & Diels

var. *monopetalus*

Status: LR-lc

Distribution: North-West

*Xylopia adoratissima* Welw. ex Oliv.

Status: LR-lc

Distribution: Caprivi

## APIACEAE

*Heteramarpha papillasa* C.C.Towns.

Status: LR-lc

Endemism: Endemic

Distribution: Central

*Phlyctidocarpa flava* Cannon & Theobald

Status: LR-lc

Endemism: Endemic

Distribution: North-West

## APOCYNACEAE

*Adenium boehmianum* Schinz

Status: LR-lc

Distribution: North

*Baissea wulfharstii* Schinz

Status: LR-lc

*Brachystelma blepharathera* H.E.Huber

Status: LR-lc

Endemism: Endemic

Distribution: wide

*Brachystelma circinatum* E.Mey.

Status: LR-nt

Threats: Grazing/browsing

Distribution: North-East, East-Central

*Usually in the open amongst tufts of grass between trees.*

*Brachystelma cupulatum* R.A.Dyer

Status: LR-nt

*Probably undercollected and confused, but is common and may be more widespread.*

*Brachystelma dinteri* Schltr.

Status: LR-lc

Threats: Collection

Distribution: Central to East

*Very variable in habitat preferences. Often overlooked as it is inconspicuous; the leaves could be mistaken for other herbs.*

*Brachystelma gymnopodium* (Schltr.) Bruyns

Status: LR-lc

*Brachystelma stenaphyllum* (Schltr.) R.A.Dyer

Status: LR-nt

Threats: Grazing/browsing

Distribution: Central

*Inconspicuous plant that grows close to or underneath bushes, some in grass clumps.*

*Carissa haematocarpa* (Eckl.) A.DC.

Status: LR-lc

Distribution: South

*Cerapegia lugardiae* N.E.Br.

Status: LR-lc

Threats: Collection

Distribution: Central, East-Central, North-East

*Striking and vigorous.*

*Ceropegia multiflora* Baker subsp. *tentaculata*

(N.E.Br.) H.E.Huber

Status: LR-lc

Threats: Collection



***Ceropegia nilotica* Kotschy**

**Status: LR-lc**

Threats: Collection

Moist orens with thick bushes ond deep soil, but confined to the thickest bushes. Rother ottractive flower.

***Ceropegia purpurascens* K.Schum.**

**Status: LR-nt**

Threats: Habitat degradation, urban expansion, collection

Distribution: Caprivi

Prefers very dense bush ond forest in wet orens.

***Cerapegia racemasa* N.E.Br. subsp. *setifera***

**(Schltr.) H.E.Huber**

**Status: LR-nt**

Threats: Collection

Occurs on limestone, dolomite or granite outcrops. Nomibion specimens deviate from the South Africon form. The species is similar to *Pentarrhinum insipidum* vegetotively ond may be undercollected.

***Ceropegia stenaloba* Hochst. ex Chiov.**

**Status: LR-nt**

Threats: Collection

Distribution: Central

Can be confused with *Pentarrhinum insipidum* vegetotively. Odd combination of features for the genus.

***Cynanchum meyeri* (Decne.) Schltr.**

**Status: LR-nt**

Endemism: Endemic

Threats: Mining

Distribution: South-West

Not directly threatened because of its remote habitat.

***Cynanchum orangeanum* (Schltr.) N.E.Br.**

**Status: LR-lc**

***Duvalia maculata* N.E.Br.**

**Status: LR-nt**

Endemism: Near-endemic

Distribution: Central

***Duvalia polita* N.E.Br.**

**Status: LR-lc**

Threats: Collection

Widespread ond variable.

***Etadadium latifolium* (Schinz) N.E.Br.**

**Status: LR-lc**

Endemism: Endemic

Threats: Mining

Distribution: South

***Etadadium rotundifolium* (H.Huber) Venter & Kotze**

**Status: LR-lc**

Endemism: Endemic

Distribution: North-West

***Etadadium virgatum* E.Mey.**

**Status: LR-lc**

Endemism: Near-endemic

Distribution: South-West, South-West-Central

***Gamphocarpus filiformis* (E.Mey.) Dietr.**

**Status: LR-lc**

***Gamphocarpus rostratus* (N.E.Br.) Bullock**

**Status: LR-nt**

Threats: Habitat degradation

Distribution: North-East

Not collected since the 1950s; could be undercollected ond missed because of growing in the grassveld.

***Gomphocarpus tomentosus* Burch.**

**Status: LR-lc**

***Haadia currorii* (Haak.) Decne. subsp. *currorii***

**Status: LR-lc**

Endemism: Near-endemic

Threats: Collection

Distribution: wide

Is cultivated.

***Hoodia flava* (N.E.Br.) Plowes**

**Status: LR-nt**

Endemism: Near-endemic

Threats: Grazing/browsing, collection

Distribution: South-East

***Hoodia gordonii* (Masson) Sweet ex Decne.**

**Status: LR-lc**

Threats: Grazing/browsing, collection

Distribution: wide

***Haadia parviflora* N.E.Br.**

**Status: LR-lc**

Endemism: Near-endemic

Distribution: North-West

***Lavrania marlathii* (N.E.Br.) Bruyns**

**Status: LR-lc**

Threats: Collection

***Lavrania picta* (N.E.Br.) Bruyns subsp. *picta***

**Status: LR-nt**

Threats: Collection

***Microloma calycinum* E.Mey. subsp. *calycinum***

**Status: LR-lc**

Endemism: Near-endemic

Distribution: South-West

Dry, rocky slopes.

***Microloma hereroense* Wanntorp**

**Status: LR-lc**

Endemism: Endemic

Distribution: North-West-Central

High orens only.

***Microloma incanum* Decne.**

**Status: LR-lc**

Endemism: Near-endemic

***Microloma longitubum* Schltr.**

**Status: LR-lc**

Wide ond disjunct distribution.

***Microloma penicillatum* Schltr.**

**Status: LR-lc**

Endemism: Endemic

Threats: Mining

Distribution: South-West

***Orthanthera albida* Schinz**

**Status: LR-lc**

Endemism: Near-endemic

***Orthanthera jasminiflora* (Decne.) Schinz**

**Status: LR-lc**

***Pachypodium lealii* Welw.**

**Status: LR-lc**

Endemism: Near-endemic

Threats: Grazing/browsing, collection

Distribution: North

***Pachypodium namaquanum* (Wyley ex Harv.) Welw.**

**Status: LR-nt**

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South

One of the two subpopulations assessed in two localities looked healthy, except for low regeneration/recruitment—young plants were not common. Ten other known subpopulations were not visited.

***Pentarrhinum abyssinicum* Decne. subsp.**

***abyssinicum***

**Status: LR-lc**

***Pentarrhinum abyssinicum* Decne. subsp.**

***angalense* (N.E.Br.) Liede & Nicholas**

**Status: LR-lc**

***Pentarrhinum insipidum* E.Mey.**

**Status: LR-lc**

***Pergularia daemia* (Farssk.) Chiov. var. *leiocarpa***

**(K.Schum.) H.E.Huber**

**Status: LR-lc**

***Pergularia daemia* (Forssk.) Chiov. var. *daemia***

**Status: LR-lc**

***Piarranthus decarus* (Masson) N.E.Br. subsp.**

***cornutus* (N.E.Br.) Meve**

**Status: LR-lc**

***Quaqua mammillaris* (L.) Bruyns**

**Status: LR-nt**

Threats: Mining, collection

Distribution: South

***Sarcastemma pearsonii* N.E.Br.**

**Status: LR-lc**

Endemism: Near-endemic

Distribution: wide, mainly South

***Sarcastemma viminale* (L.) R.Br. subsp. *thunbergii***

**(Dan) Liede & Meve**

**Status: LR-lc**

***Sarcastemma viminale* (L.) R.Br. subsp. *viminale***

**Status: LR-lc**

***Stapelia flavopurpurea* Marloth**

**Status: LR-nt**

Threats: Collection

Distribution: South-Central, Central

***Stapelia gariepensis* Pillans**

**Status: LR-nt**

Endemism: Near-endemic

Threats: Mining, collection

***Stapelia kwebensis* N.E.Br.**

**Status: LR-lc**

Threats: Collection

***Stapelia longipedicellata* (A.Berger) N.E.Br.**

**Status: LR-lc**

Endemism: Endemic

Threats: Collection

Distribution: wide

Very smelly.

***Stapelia schinzii* A.Berger & Schltr. var. *schinzii***

**Status: LR-lc**

Endemism: Endemic

Threats: Collection

***Stigmatorhynchus hereraensis* Schltr.**

**Status: LR-lc**

Endemism: Endemic

Distribution: North

***Strophanthus amboensis* (Schinz) Engl. & Pax**

**Status: LR-lc**

Endemism: Near-endemic

Distribution: North-West, North-West-Central, Central

***Tridentea marientalensis* (Nel) L.C.Leach subsp.**

***albipilosa* (Giess) L.C.Leach**

**Status: LR-nt**

Endemism: Endemic

Threats: Collection

Distribution: South-Central, South-East

***Tridentea marientalensis* (Nel) L.C.Leach subsp.**

***marientalensis***

**Status: LR-lc**

Endemism: Near-endemic

Threats: Collection

Distribution: South-East

*Tylophora fleckii* (Schltr.) N.E.Br.

Status: LR-lc

Endemism: Endemic

Distribution: wide

## ASPHODELACEAE

*Aloe asperifolia* A.Berger

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation, collection

Distribution: North-West, Caprivi

Could be confused with *A. pachygaster* and *A. claviflora*.

*Aloe claviflora* Burch.

Status: LR-nt

Threats: Mining, collection

Distribution: South-East

May be confused with *A. pachygaster*.

*Aloe dichotoma* Masson

Status: LR-lc

Endemism: Near-endemic

Distribution: South to North-West-Central

*Aloe esculenta* L.C.Leach

Status: LR-lc

Threats: Habitat degradation, urban expansion, collection

Distribution: Central, East

Flowers eaten.

*Aloe gariensis* Pillans

Status: LR-nt

Endemism: Near-endemic

Threats: Collection

Distribution: South

*Aloe hereroensis* Engl. var. *hereroensis*

Status: LR-lc

*Aloe hereroensis* Engl. var. *lutea* A.Berger

Status: LR-lc

*Aloe littoralis* Baker

Status: LR-lc

*Aloe striata* Haw. subsp. *karasbergensis* (Pillans)

Glen & D.S.Hardy

Status: LR-nt

Endemism: Near-endemic

Threats: Habitat degradation, collection

Distribution: South-Central

Evidence of illegal collecting was found.

*Aloe variegata* L.

Status: LR-nt

Threats: Collection

Distribution: South-West

Small plant 10–15 cm. Relatively common in the south.

*Aloe zebrina* Baker

Status: LR-lc

Threats: Collection

*Trachyandra ensifolia* (Sölch) Roessler

Status: LR-nt

Endemism: Endemic

Distribution: South

## ASTERACEAE

*Anisopappus pinnatifidus* (Klatt) O.Hoffm. ex Hutch.

Status: LR-lc

Endemism: Endemic

Distribution: wide

*Antiphona fragrans* (Merxm.) Merxm.

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central, North

*Antiphona pinnatisecta* (S.Moore) Merxm.

Status: LR-lc

Endemism: Endemic

Distribution: wide

*Arctotis leiocarpa* Harv.

Status: LR-lc

*Berkheya schinzii* O.Hoffm.

Status: LR-lc

Endemism: Endemic

Distribution: South

*Calostephane marlothiana* O.Hoffm.

Status: LR-lc

Endemic

Distribution: wide, mainly West

*Crassocephalum coeruleum* (O.Hoffm.) R.E.Fr.

Status: LR-lc

Endemism: Endemic

Distribution: Central

*Didelta carnosa* (L.f.) Aiton var. *carnosa*

Status: LR-lc

Endemism: Near-endemic

*Didelta spinosa* (L.f.) Aiton

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West

*Eriocephalus ambiguus* (DC.) M.A.N.Müller

Status: LR-lc

Undercollected.

*Eriocephalus dinteri* S.Moore

Status: LR-lc

Endemism: Endemic

Distribution: South-West-Central, South-Central, South-East

Restricted to high mountains above 1,000 m.

*Eriocephalus giessii* M.A.N.Müller

Status: LR-lc

Endemism: Endemic

Threats: Mining

Distribution: South-West

In mountainous areas over 1,000 m above sea level.

*Eriocephalus kingesii* Merxm. & Eberle

Status: LR-nt

Endemism: Endemic

Threats: Mining

Distribution: South-West

Occurs mainly near the coast.

*Eriocephalus pauperrimus* Merxm. & Eberle

Status: LR-lc

Distribution: South-Central, South-East

Undercollected.

*Eriocephalus pinnatus* O.Hoffm.

Status: LR-lc

Endemism: Endemic

Threats: Browsing

Distribution: North-West, North-West-Central

Unique in the genus.

*Eriocephalus scariosus* DC.

Status: LR-lc

Endemism: Near-endemic

*Felicia smaragdina* (S.Moore) Merxm.

Status: LR-lc

Endemism: Endemic

Distribution: wide, mainly South

*Geigeria acaulis* Benth. & Hook.f. ex Oliv. & Hiern

Status: LR-lc

*Geigeria alata* (DC.) Benth. & Hook.f. ex Oliv. & Hiern

Status: LR-lc

*Helichrysum tomentosulum* (Klatt) Merxm. subsp. *aromaticum* (Dinter) Merxm.

Status: LR-lc

Endemism: Near-endemic

*Lasiopogon volkii* (B.Nord.) Hilliard

Status: LR-lc

Endemism: Endemic

Distribution: South

*Myxopappus hereroensis* (O.Hoffm.) Källersjö

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central, North

*Ondetia linearis* Benth.

Status: LR-lc

Endemism: Endemic

Distribution: Central, North

*Osteospermum montanum* Klatt

Status: LR-lc

Endemism: Endemic

Distribution: Central

*Osteospermum muricatum* E.Mey. ex DC. subsp. *longiradiatum* Norl.

Status: LR-lc

Endemism: Endemic?

Distribution: Central

*Othonna brandbergensis* B.Nord.

Status: LR-nt

Endemism: Endemic

Distribution: North-West-Central

On high areas of mountains only and may therefore be more widespread. Very fragmented distribution.

*Othonna graveolens* O.Hoffm.

Status: LR-nt

Endemism: Endemic?

Threats: Mining

Distribution: South-West

*Othonna lasiocarpa* (DC.) Sch.Bip.

Status: LR-lc

Threats: Collection

Distribution: West to South

Good subject for bonsai.

*Othonna protecta* Dinter

Status: LR-lc

Threats: Collection

Distribution: West

*Othonna sparsiflora* (S.Moore) B.Nord.

Status: LR-lc

Endemism: Endemic?

Threats: Mining, collection

Distribution: South-West

*Pegolettia oxyodonta* DC.

Status: LR-lc

Endemism: Near-endemic

*Pegolettia pinnatilobata* (Klatt) O.Hoffm. ex Dinter

Status: LR-lc

Endemism: Endemic

Distribution: wide

*Pegolettia plumosa* M.D.Hend.

Status: LR-nt

Endemism: Endemic

Distribution: mainly South

May be more widespread than specimens indicate.



*Pegolettia retrofracta* (Thunb.) Kies  
Status: LR-lc

*Pegolettia senegalensis* Cass.  
Status: LR-lc

*Pteronia eenii* S.Moore  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Pteronia polygalifolia* O.Hoffm.  
Status: LR-lc  
Endemism: Endemic  
Distribution: South-West-Central, South-Central

*Rennera eenii* (S.Moore) Källersjö  
Status: LR-nt  
Endemism: Endemic  
Distribution: Central, East-Central  
*Used as chomomile.*

*Rennera limnophila* Merxm.  
Status: LR-lc  
Endemism: Near-endemic

*Senecio alliariifolius* O.Hoffm.  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West

*Senecio engleranus* O.Hoffm.  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide, mainly West

*Senecio giessii* Merxm.  
Status: LR-lc  
Endemism: Endemic  
Distribution: South-Central

*Tripteris nervosa* Hutch.  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide

*Vernonia obionifolia* O.Hoffm. subsp. *dentata*  
Merxm.  
Status: LR-lc  
Endemism: Endemic

*Vernonia obionifolia* O.Hoffm. subsp. *obionifolia*  
Status: LR-lc  
Endemism: Endemic

## BALANITACEAE

*Balanites welwitschii* (Tiegh.) Exell & Mendonça  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

## BIGNONIACEAE

*Catophractes alexandri* D.Don  
Status: LR-lc

*Rhigozum virgatum* Merxm. & A.Schreib.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

## BORAGINACEAE

*Cordia grandicalyx* Oberm.  
Status: LR-lc

*Cordia monoica* Roxb.  
Status: LR-lc

*Cordia sinensis* Lam.  
Status: LR-lc  
Distribution: Caprivi

## BRASSICACEAE

*Heliophila carnosa* (Thunb.) Steud.  
Status: LR-lc

*Heliophila cornuta* Sond. var. *squamata* (Schltr.)  
Marais  
Status: LR-lc

*Heliophila deserticola* Schltr. var. *deserticola*  
Status: LR-lc

*Sisymbrium burchellii* DC. var. *burchellii*  
Status: LR-lc

## BURSERACEAE

*Commiphora africana* (A.Rich.) Engl.  
Status: LR-lc

*Commiphora anacardiifolia* Dinter & Engl.  
Status: LR-lc  
Endemism: Near-endemic  
Threats: Collection  
Distribution: North-West

*Commiphora capensis* (Sond.) Engl.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: South

*Commiphora cervifolia* J.J.A.van der Walt  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Collection  
Distribution: South  
*Is sought-after for gordens. Not common.*

*Commiphora crenato-serrata* Engl.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Commiphora dinteri* Engl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: West

*Commiphora discolor* Mendes  
Status: LR-lc  
Endemism: Near-endemic  
Threats: Collection  
Distribution: North-West

*Commiphora edulis* (Klotzsch) Engl.  
Status: LR-lc  
*Occasional in riverbank (Zombezi) bush.*

*Commiphora giessii* J.J.A.van der Walt  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West

*Commiphora glandulosa* Schinz  
Status: LR-lc

*Commiphora glaucescens* Engl.  
Status: LR-lc  
Endemism: Near-endemic

*Commiphora gracilifrons* Dinter ex J.J.A.van der Walt  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
*Sought-after for gordens, not common.*

*Commiphora krauseliana* Heine  
Status: LR-lc  
Endemism: Endemic  
Threats: Collection  
Distribution: North-West, North-West-Central

*Commiphora mollis* (Oliv.) Engl.  
Status: LR-lc  
*Distribution: Caprivi*

*Commiphora multijuga* (Hiern) K.Schum.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Commiphora namaensis* Schinz  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West-Central, South-East

*Commiphora oblaneolata* Schinz  
Status: LR-nt  
Endemism: Near-endemic  
Distribution: North-West, North-West-Central  
*Hos fragmented distribution and is not common where it occurs.*

*Commiphora pyracanthoides* Engl.  
Status: LR-lc

*Commiphora saxicola* Engl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: West

*Commiphora tenuipetiolata* Engl.  
Status: LR-lc

*Commiphora virgata* Engl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West, North-West-Central

*Commiphora wildii* Merxm.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West, North-West-Central

## CAMPANULACEAE

*Wahlenbergia androsacea* A.DC.  
Status: LR-lc

*Wahlenbergia erophiloides* Markgr.  
Status: LR-nt  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West  
*Could be overlooked and is probably more widespread.*

## CAPPARACEAE

*Boscia angustifolia* A.Rich. var. *corymbosa* (Gilg)  
DeWolf  
Status: LR-nt  
Distribution: Caprivi  
*Very few specimens and small distribution.*

*Boscia microphylla* Oliv.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Boscia tomentosa* Toelken  
Status: LR-nt  
Endemism: Near-endemic  
Distribution: North-West  
*May be undercollected.*

*Cadaba aphylla* (Thunb.) Wild  
Status: LR-lc

*Cadaba schroepelii* Suess.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West, North-West-Central

*Capparis hereroensis* Schinz  
Status: LR-lc  
Endemism: Endemic?  
Distribution: South-West-Central

*Capparis tomentosa* Lam.  
Status: LR-lc  
Distribution: North-East  
Not many specimens and collected decades ago.

*Cleome carnasa* (Pax) Gilg & Benedict  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West-Central

*Maerua angolensis* DC.  
Status: LR-lc

*Maerua gilgit* Schinz  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-West

*Maerua juncea* Pax subsp. *juncea*  
Status: LR-lc

*Maerua parvifolia* Pax  
Status: LR-lc

*Maerua schinzii* Pax  
Status: LR-lc

## CARYOPHYLLACEAE

*Dianthus namaensis* Schinz var. *dinteri* (Schinz) Hooper  
Status: LR-lc  
Endemism: Near-endemic

## CELASTRACEAE

*Gymnasparia garipeensis* M.Jordaan ined.  
Status: LR-lc  
Endemism: Near-endemic

*Gymnosporia linearis* (L.f.) Loes. subsp. *lanceolata* (E.Mey. ex Sond.) M.Jordaan ined.  
Status: LR-lc  
Endemism: Near-endemic

*Gymnasparia syzysylovi* (Kuntze) M.Jordaan subsp. *namibensis* M.Jordaan ined.  
Status: LR-lc  
Endemism: Near-endemic

## CHENOPODIACEAE

*Atriplex amboensis* Schinz  
Status: LR-lc

*Lophiarcus latifolius* Nowicke  
Status: LR-lc

*Lophiarcus palystachyus* Turcz.  
Status: LR-lc

*Lophiarcus tenuissimus* Hook.f.  
Status: LR-lc

*Suaeda articulata* Aellen  
Status: LR-lc  
Endemism: Endemic  
Distribution: North

## COLCHICACEAE

*Hexacortis dickiana* Dinter  
Status: LR-lc  
Endemism: Near-endemic

*Ornithoglossum calcicola* K.Krause & Dinter  
Status: LR-lc  
Endemism: Endemic  
Distribution: North, Central  
Poisonous.

## COMBRETACEAE

*Cambretum albopunctatum* Suess.  
Status: LR-lc  
Distribution: North-East

*Combretum elaeagnoides* Klotzsch  
Status: LR-lc  
Distribution: North-East

*Cambretum psidioides* Welw. subsp. *dinteri* (Schinz) Exell  
Status: LR-lc

*Cambretum wattii* Exell  
Status: LR-lc  
Endemism: Near-endemic

## CONNARACEAE

*Raurea orientalis* Baill.  
Status: LR-lc  
Distribution: Caprivi

## CONVOLVULACEAE

*Merremia bipinnatifida* (Engl.) Hallier f.  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West-Central

*Merremia guerichii* A.Meeuse  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West, Central

*Seddera schizantha* Hallier f.  
Status: LR-lc  
Endemism: Near-endemic

## CRASSULACEAE

*Crassula brevifolia* Harv. subsp. *brevifolia*  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West

*Crassula elegans* Schonland & Baker f. subsp. *elegans*  
Status: LR-lc  
Endemism: Near-endemic  
Threats: Collection  
Distribution: South-West  
On soil and quartzite.

*Crassula fusca* A.G.J.Herre  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Collection  
Distribution: South-West

*Crassula lanceolata* (Eckl. & Zeyh.) Endl. ex Walp. subsp. *transvaalensis* (Kuntze) Toelken  
Status: LR-lc

*Crassula macawaniana* Schonland & Baker f.  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West

*Crassula muscaca* L. var. *muscaca*  
Status: LR-lc

*Crassula rhodesica* (Merxm.) Wickens & Bywater  
Status: LR-lc

*Tylecodon paniculatus* (L.f.) Toelken  
Status: LR-nt  
Threats: Collection  
Distribution: South  
Hybridises easily.

*Tylecadon rubraevosus* (Dinter) Toelken  
Status: LR-lc  
Endemism: Near-endemic  
Many juveniles seen.

*Tylecodon schaeferianus* (Dinter) Toelken  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
Grows in sun on low to high rock outcrops and inselbergs.

## CUCURBITACEAE

*Acanthascias harridus* Welw. ex Hook.f.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: West

*Acanthascias naudinianus* (Sond.) C.Jeffrey  
Status: LR-lc

*Citrullus ecirrhatus* Cogn.  
Status: LR-lc  
Endemism: Near-endemic

*Citrullus rehmi* De Winter  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide, mainly West

*Carallacarpus schinzii* Cogn.  
Status: LR-lc  
Endemism: Near-endemic

*Dactyliandra welwitschii* Hook.f.  
Status: LR-lc  
Endemism: Near-endemic

*Momardica welwitschii* Hook.f.  
Status: LR-lc  
Endemism: Near-endemic

## CYPERACEAE

*Balbaschoenus nabilis* (Ridl.) Goetgh. & Simpson  
Status: LR-lc  
Endemism: Near-endemic  
Needs permanent water.

## DRACAENACEAE

*Sansevieria pearsanii* N.E.Br.  
Status: LR-lc

## EBENACEAE

*Diaspyras acockii* (De Winter) De Winter  
Status: LR-lc  
Endemism: Near-endemic



Distribution: North-West-Central, South-East  
*Incorrectly identified.*

*Diospyros chamaethamnus* Dinter ex Mildbr.  
Status: LR-lc  
Forms colonies covering large oreos. *Hos ethnobotanical use.*

*Diospyros virgata* (Gürke) Brenan  
Status: LR-lc  
Distribution: North-East

*Euclea asperima* Friedr.-Holzh.  
Status: LR-nt  
Endemism: Endemic  
Distribution: South-West

## ELATINACEAE

*Bergia glutinosa* Dinter & Schulze-Menz  
Status: LR-lc  
Endemism: Near-endemic

## ERIOSPERMACEAE

*Eriospermum bakerianum* Schinz subsp.  
*bakerianum*  
Status: LR-lc

*Eriospermum bakerianum* Schinz subsp. *tortuosum*  
(Dammer) P.L. Perry  
Status: LR-lc

*Eriospermum mackenii* (Hook.f.) Baker subsp.  
*galpinii* (Schinz) P.L. Perry  
Status: LR-lc

*Eriospermum rautanenii* Schinz  
Status: LR-lc

*Eriospermum roseum* Schinz  
Status: LR-lc  
Endemism: Near-endemic

## EUPHORBIACEAE

*Euphorbia avasmontana* Dinter  
Status: LR-lc

*Euphorbia caperonioides* R.A.Dyer & P.G.Mey.  
Status: LR-nt  
Endemism: Endemic  
Distribution: North-West  
*May be undercollected.*

*Euphorbia chamaesycoides* B.Nord.  
Status: LR-nt  
Endemism: Endemic

*Euphorbia chersina* N.E.Br.  
Status: LR-lc  
Endemism: Near-endemic  
Threats: Collection  
Distribution: South-West

*Euphorbia crotonoides* Boiss.  
Status: LR-lc

*Euphorbia damarana* L.C. Leach  
Status: LR-lc  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West-Central

*Euphorbia decussata* E.Mey. ex Boiss.  
Status: LR-lc  
Endemism: Near-endemic  
Threats: Collection

*Euphorbia dregeana* E.Mey. ex Boiss.  
Status: LR-lc

Endemism: Near-endemic  
Threats: Collection

*Euphorbia ephedroides* E.Mey ex Boiss. var.  
*ephedroides*  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Collection

*Euphorbia forskalii* J.Gay, Webb & Berthel.  
Status: LR-lc

*Euphorbia gariepina* Boiss. subsp. *balsamea*  
(Welw. ex Hiern) L.C. Leach  
Status: LR-lc  
Threats: Collection

*Euphorbia gariepina* Boiss. subsp. *gariepina*  
Status: LR-lc  
Threats: Collection

*Euphorbia giessii* L.C. Leach  
Status: LR-lc  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West-Central

*Euphorbia glanduligera* Pax  
Status: LR-lc

*Euphorbia gregaria* Marloth  
Status: LR-lc  
Endemism: Near-endemic  
Threats: Collection

*Euphorbia guerichiana* Pax  
Status: LR-lc  
Threats: Collection

*Euphorbia gummifera* Boiss.  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Collection

*Euphorbia hamata* (Haw.) Sweet  
Status: LR-nt  
Endemism: Near-endemic  
Threats: Collection

*Euphorbia insarmentosa* P.G.Mey.  
Status: LR-nt  
Endemism: Endemic  
Distribution: North-West

*Euphorbia juttiae* Dinter  
Status: LR-nt  
Endemism: Endemic  
Distribution: South-West, South-West-Central

*Euphorbia lignosa* Marloth  
Status: LR-lc  
Endemism: Near-endemic  
Threats: Collection  
Distribution: wide

*Euphorbia monteiroi* Hook.f. subsp. *monteiroi*  
Status: LR-lc  
Threats: Collection

*Euphorbia phylloclada* Boiss.  
Status: LR-lc

*Euphorbia rudis* N.E.Br.  
Status: LR-nt  
Endemism: Endemic  
Threats: Collection

*Euphorbia transvaalensis* Schltr.  
Status: LR-lc  
Threats: Collection

*Euphorbia virosa* Willd.  
Status: LR-lc  
Threats: Collection

*Jatropha orangeana* Dinter ex P.G.Mey.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-Central, South-East

## FABACEAE

*Acacia hebeclada* DC. subsp. *tristis* A.Schreib.  
Status: LR-lc

*Acacia mellifera* (Vahl) Benth. subsp. *mellifera*  
Status: LR-lc

*Acacia montis-usti* Merxm. & A.Schreib.  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West

*Acacia nebrownii* Burtt Davy  
Status: LR-lc

*Acacia robynsiana* Merxm. & A.Schreib.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

*Acacia senegal* (L.) Willd. var. *rostrata* Brenan  
Status: LR-lc

*Adenolobus pechuelii* (Kuntze) Torre & Hillc.  
subsp. *mossamedensis* (Torre & Hillc.) Brummitt &  
J.H. Ross  
Status: LR-lc  
Endemism: Near-endemic

*Adenolobus pechuelii* (Kuntze) Torre & Hillc.  
subsp. *pechuelii*  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West, North-West-Central

*Albizia antunesiana* Harms  
Status: LR-lc

*Amblygonocarpus andongensis* (Welw. ex Oliv.)  
Exell & Torre  
Status: LR-lc

*Bobgunnia madagascariensis* (Desv.) J.H. Kirkbr. &  
Wiersema  
Status: LR-lc

*Caesalpinia pearsonii* L. Bolus  
Status: LR-lc  
Endemism: Endemic  
Distribution: South-West-Central  
*Common and fairly widespread.*

*Caesalpinia rubra* (Engl.) Brenan  
Status: LR-lc  
Endemism: Near-endemic

*Crotalaria laburnifolia* L. subsp. *australis* (Baker  
f.) Polhill  
Status: LR-lc  
Distribution: Caprivi

*Cullen biflora* (Harv.) C.H. Stirt.  
Status: LR-lc  
Endemism: Near-endemic

*Cyamopsis serrata* Schinz  
Status: LR-lc

*Dichrostachys cinerea* (L.) Wight & Arn. subsp.  
*africana* Brenan & Brummitt var. *africana*  
Status: LR-lc

*Entada arenaria* Schinz subsp. *arenaria*  
Status: LR-lc  
Distribution: Caprivi

***Erythrino decoro* Harms**

Status: LR-lc  
Endemism: Endemic

***Erythrophleum africanum* (Welw. ex Benth.) Harms**

Status: LR-lc

***Faidherbia albida* (Delile) A.Chev.**

Status: LR-lc

***Haemotoxylum dinteri* (Harms) Harms**

Status: LR-lc  
Endemism: Endemic  
Distribution: South-Central  
Seeds were collected for research on biological control of *Caesalpinia decapetala*. It is common and seeds are plentiful.

***Indigofera adenoides* Baker f.**

Status: LR-lc

***Indigofera ostrogolino* DC.**

Status: LR-lc

***Indigofera boumiano* Harms**

Status: LR-lc

***Indigofera demisso* Taub.**

Status: LR-lc

***Indigofera filipes* Benth. ex Harv.**

Status: LR-lc

***Indigofera flovicons* Baker var. *flavicons***

Status: LR-lc

***Indigofera gairdneriae* Hutch. ex Baker f.**

Status: LR-lc

***Indigofera heterotricho* DC.**

Status: LR-lc

***Indigofera holubii* N.E.Br.**

Status: LR-lc

***Indigofera inhambanensis* Klotzsch**

Status: LR-lc

***Indigofera nivicoulis* E.Mey.**

Status: LR-lc  
Endemism: Near-endemic

***Indigofera nummularifolia* (L.) Liv. ex Alston**

Status: LR-lc

***Indigofera pechuelii* Kuntze**

Status: LR-lc  
Endemism: Endemic  
Distribution: wide

***Indigofera routonenii* Baker f.**

Status: LR-lc  
Endemism: Endemic  
Distribution: Central

***Lebeckia hollenbergensis* Merxm. & A.Schreib.**

Status: LR-nt  
Endemism: Near-endemic  
Threats: Mining  
Distribution: South-West  
Confined to winter-rainfall area where mining is on the increase.

***Lessertia acanthorhochis* (Dinter) Dinter**

Status: LR-nt  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West  
On outcrops in dunes.

***Lessertia eremicola* Dinter**

Status: LR-nt

Endemism: Endemic

Threats: Mining  
Distribution: South-West

***Lotononis bainesii* Baker**

Status: LR-lc  
Known from three specimens only.

***Lotononis bracteosa* B.-E.van Wyk**

Status: LR-lc  
Endemism: Endemic  
Distribution: North-West, North-West-Central  
Previously misidentified.

***Lotononis plotycorpa* (Viv.) Pic.Serm.**

Status: LR-lc  
Most widespread of genus.

***Lotononis schreiberi* B.-E.van Wyk**

Status: LR-lc  
Endemism: Endemic  
Distribution: North-West-Central

***Lotononis strigillosa* (Merxm. & A.Schreib.) A.Schreib.**

Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-West  
Winter-rainfall region.

***Lotononis tenuis* Baker**

Status: LR-nt  
Endemism: Near-endemic  
Distribution: North-West  
Known from two specimens only.

***Mimosa pigra* L.**

Status: LR-lc

***Neoroutononia omboensis* Schinz**

Status: LR-lc

***Neptunia oleracea* Lour.**

Status: LR-lc

***Ormocarpum kirkii* S.Moore**

Status: LR-lc  
Distribution: North-East

***Peltophorum africanum* Sond.**

Status: LR-lc

***Sesbonia microphylla* Harms ex E.Phillips & Hutch.**

Status: LR-lc

***Sesbania pachycorpa* DC. subsp. *dinterono***

J.B.Gillett  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide

***Tephrosia monophylla* Schinz**

Status: LR-lc  
Endemism: Endemic  
Distribution: North

## FLACOURTIACEAE

***Flocourtia indica* (Burm.f.) Merr.**

Status: LR-lc  
Distribution: Caprivi

***Homolium abdessammadii* Asch. & Schweinf.**

Status: LR-lc

***Oncoba spinosa* Forssk.**

Status: LR-lc  
Distribution: North-East

## FRANKENIACEAE

***Fronkenia pomonensis* Pohnert**

Status: LR-nt  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West  
Has been recorded at old mine site, so appears to be able to grow on disturbed areas along the coast.

## GERANIACEAE

***Pelargonium otaviense* R.Knuth**

Status: LR-lc  
Endemism: Endemic  
Distribution: wide

***Sarcocaulon inerme* Rehm**

Status: LR-lc  
Endemism: Endemic  
Distribution: South

***Sarcocaulon marlothii* Engl.**

Status: LR-lc  
Endemism: Endemic  
Distribution: wide

***Sarcocaulon mossamedense* (Welw. ex Oliv.) Hiern**

Status: LR-lc  
Endemism: Near-endemic  
Distribution: North-West

***Sarcocaulon patersonii* (DC.) G.Don**

Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-West

## HYACINTHACEAE

***Lachenalia giessii* W.F.Barker**

Status: LR-lc  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South

***Ornithogolum candidum* Oberm.**

Status: LR-lc  
Endemism: Endemic  
Distribution: Central, South-West-Central

***Ornithogalum glandulosum* Oberm.**

Status: LR-nt  
Endemism: Near-endemic  
Distribution: South-West

***Ornithogolum nonodes* F.M.Leight.**

Status: LR-nt  
Endemism: Near-endemic  
Distribution: South-West  
Very small geophyte.

***Ornithogalum ornithogoloides* (Kunth) Oberm.**

Status: LR-lc  
Distribution: East-Central

***Ornithogalum pulchrum* Schinz**

Status: LR-lc

***Ornithogalum rautanenii* Schinz**

Status: LR-lc  
Endemism: Endemic  
Distribution: North  
Grows near waterholes so may be threatened by transformation of the area.

***Ornithogalum seineri* (Engl. & K.Krause) Oberm.**

Status: LR-lc



*Ornithagalum stapffii* Schinz

Status: LR-lc

Endemism: Endemic

Distribution: wide

*Ornithagalum subcoriaceum* L.Bolus

Status: LR-lc

Distribution: South-West

*Ornithagalum taxicarium* C.Archer & R.H.Archer

Status: LR-lc

*Ornithagalum tubiforme* (Oberm.) Oberm.

Status: LR-lc

Endemism: Endemic

Distribution: Central

*Ornithagalum unifalium* Retz.

Status: LR-nt

## HYDROPHYLLACEAE

*Cadon rayenii* L.

Status: LR-lc

Near-endemic

*Codon schenckii* Schinz

Status: LR-lc

Endemism: Near-endemic

## IRIDACEAE

*Ferraria glutinosa* (Baker) Rendle

Status: LR-lc

*Gladiolus dalenii* Van Geel

Status: LR-lc

*Gladiolus magnificus* (Harms) Goldblatt

Status: LR-nt

Known from very few specimens. Magnificent plant.

Occurs in Kolohori sandveld, often with tall grass that is regularly overgrazed or burnt in northeast.

*Gladiolus archidiflorus* Andrews

Status: LR-nt

Distribution: South-West

One of the most widespread South African winter-rainfall species. Difficult to see because of dull colour of the flowers, but these are wonderfully scented.

*Gladiolus permeabilis* D.Delarache subsp. *edulis*

(Burch. ex Ker Gawl.) Oberm.

Status: LR-lc

*Gladiolus saccatus* (Klatt) Goldblatt & M.P.de Vos

Status: LR-lc

*Moraea carsonii* Baker

Status: LR-nt

Open grassland and rocky slopes—seasonally wet.

Poorly known, but is expected to be more widespread.

*Moraea palystachya* (Thunb.) Ker Gawl.

Status: LR-nt

Widespread in dry areas, variety of habitats. Can cover hectares in good years. Poisonous to cattle and sheep.

*Moraea venenata* Dinter

Status: LR-nt

Flot areas of alkaline to saline soils. Almost near-endemic. Toxic to stock. Needs study.

## LAMIACEAE

*Aeallanthus neglectus* (Dinter) Launert

Status: LR-lc

*Hemizygia floccosa* Launert

Status: LR-nt

Endemism: Endemic

Distribution: North-West-Central

Has ethnobotanical use.

*Hyptis spicigera* Lam.

Status: LR-lc

*Plectranthus dinteri* Briq.

Status: LR-lc

Endemism: Endemic

Distribution: North-Central

*Plectranthus hereraensis* Engl.

Status: LR-lc

*Stachys dinteri* Launert

Status: LR-lc

Endemism: Endemic

Distribution: Central

## LOBELIACEAE

*Labelia erinus* L.

Status: LR-lc

## LORANTHACEAE

*Agelanthus discolor* (Schinz) Balle

Status: LR-lc

Endemism: Endemic

Distribution: Central, North

*Agelanthus pungu* (De Wild.) Polhill & Wiens

Status: LR-lc

Distribution: Caprivi

*Agelanthus terminaliae* (Engl. & Gilg) Polhill & Wiens

Status: LR-lc

Distribution: North-East

*Oncocalyx welwitschii* (Engl.) Polhill & Wiens

Status: LR-lc

Endemism: Near-endemic

Distribution: Central

*Phragmanthera dombeyae* (K.Krause & Dinter)

Polhill & Wiens

Status: LR-lc

Endemism: Near-endemic

Distribution: Central

Usually montane or riverine forest, can be a pest.

*Phragmanthera glaucocarpa* (Peyr.) Balle

Status: LR-lc

Endemism: Near-endemic

Distribution: North-Central

Ploteau regions. Is a parasite on *Croton*, but also has other hosts, pest of citrus.

*Phragmanthera guerichii* (Engl.) Balle

Status: LR-lc

Endemism: Near-endemic

Distribution: North

*Plicasepalus kalachariensis* (Schinz) Danser

Status: LR-lc

Distribution: North

*Plicasepalus undulatus* (E.Mey. ex Harv.) Tiegh.

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West to North

*Septulina glauca* (Thunb.) Tiegh.

Status: LR-lc

Distribution: South-West

*Septulina ovalis* (E.Mey. ex Harv.) Tiegh.

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West

*Tapinanthus aleifolius* (J.C.Wendl.) Danser

Status: LR-lc

## LYTHRACEAE

*Nesaea schinzii* Koehne

Status: LR-lc

*Rotala dinteri* Kaehne

Status: LR-lc

Endemism: Near-endemic

## MALVACEAE

*Gassypium herbaceum* L. subsp. *africanum*

(D.Watt) Vallesen

Status: LR-lc

*Hibiscus articulatus* Hachst. ex A.Rich.

Status: LR-lc

Distribution: Caprivi

*Pavania rehmannii* Szyszyl.

Status: LR-lc

Endemism: Endemic

Distribution: wide

## MELIACEAE

*Turraea zambesica* Sprague & Hutch.

Status: LR-lc

Distribution: Caprivi

## MELIANTHACEAE

*Melanthus pectinatus* Harv. subsp. *gariepinus*

(Merxm. & Raessler) Tansley

Status: LR-lc

Endemism: Near-endemic

Distribution: South-Central, South-East

## MENISPERMACEAE

*Antizama angustifolia* (Burch.) Miers ex Harv.

Status: LR-lc

## MESEMBRYANTHEMACEAE

*Amphibalia rupis-arcutae* (Dinter)

H.E.K.Hartmann

Status: LR-lc

Endemism: Endemic?

Threats: Mining, collection

Distribution: South-West

In soft, firm sand near the sea and on slopes, often in limestone.

*Amphibalia saginata* (L.Bolus) H.E.K.Hartmann

Status: LR-nt

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

*Antimima dalamitica* (Dinter) H.E.K.Hartmann

Status: LR-nt

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

*Antimima perforata* (L.Bolus) H.E.K.Hartmann

Status: LR-lc

Threats: Mining, collection

*Aptenia geniculiflora* (L.) Bittrich ex Gerbaulet

ined.

Status: LR-lc

Distribution: North-West-Central to South-East

Very widespread.

*Aridaria brevicarpa* L.Bolus

Status: LR-lc

Widespread and common.

*Aridaria noctiflora* (L.) Schwantes subsp. *noctiflora*

Status: LR-lc

Widespread and common.

*Aridaria noctiflora* (L.) Schwantes subsp. *straminea* (Haw.) Gerbaulet

Status: LR-lc

Endemism: Near-endemic

Widespread and common.

*Aridaria serotina* L.Bolus

Status: LR-lc

Widespread and common.

*Brownanthus ciliatus* (Aiton) Schwantes subsp. *schenckii* (Schinz) Ihlenf. & Bittrich

Status: LR-lc

Endemism: Endemic

Distribution: South-West, South-East

*Cephalophyllum ebracteatum* (Pax ex Schltr. & Diels) Dinter & Schwantes

Status: LR-lc

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

One subpopulation of *o* mine is probably destroyed by now.

*Eberlanzia clausa* (Dinter) Schwantes

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Eberlanzia sedoides* (Dinter & A.Berger)

Schwantes

Status: LR-nt

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Mesembryanthemum pellitum* Friedrich

Status: LR-nt

Endemism: Endemic

Threats: Mining

Distribution: South-West

Common, but known only from fewer than five localities.

*Psammophora modesta* (Dinter & A.Berger) Dinter & Schwantes

Status: LR-lc

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

Many subpopulations.

*Psilocaulon salicornioides* (Pax) Schwantes

Status: LR-lc

Endemism: Endemic

Distribution: wide

*Synaptophyllum juttiae* (Dinter & A.Berger) N.E.Br.

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

## MOLLUGINACEAE

*Hypertelis bowkeriana* Sond.

Status: LR-lc

*Hypertelis salsoloides* (Burch.) Adamson

Status: LR-lc

*Hypertelis spergulacea* E.Mey. ex Fenzl

Status: LR-lc

Near-endemic

*Limeum aethiopicum* Burm.f. var. *glabrum* Moq.

Status: LR-lc

*Limeum arenicolum* G.Schellenb.

Status: LR-lc

*Limeum argute-carinatum* Wawra & Peyr.

Status: LR-lc

*Limeum dinteri* G.Schellenb.

Status: LR-lc

*Limeum fenestratum* (Fenzl) Heimerl var.

*fenestratum*

Status: LR-lc

*Limeum myosotis* H.Walter

Status: LR-lc

*Limeum pterocarpum* (J.Gay) Heimerl

Status: LR-lc

*Limeum sulcatum* (Klotzsch) Hutch.

Status: LR-lc

*Limeum viscosum* (J.Gay) Fenzl subsp.

*nummifolium* (H.Walter) Friedrich

Status: LR-lc

*Limeum viscosum* (J.Gay) Fenzl subsp. *viscosum*

Status: LR-lc

*Mollugo walteri* Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: South

Fairly widespread and possibly more common, if correctly identified and collected more often.

*Pharnaceum brevicaule* (DC.) Bartl.

Status: LR-lc

## MORACEAE

*Ficus fischeri* Warb. ex Mildbr. & Burret

Status: LR-lc

Distribution: Caprivi

*Ficus glumosa* Delile

Status: LR-lc

Distribution: North-West

*Ficus pygmaea* Welw. ex Hiern

Status: LR-lc

Distribution: Caprivi

Hos ethnobotanical use.

*Ficus sycomorus* L.

Status: LR-lc

*Ficus thonningii* Blume

Status: LR-lc

## MORINGACEAE

*Moringa ovalifolia* Dinter & A.Berger

Status: LR-lc

Endemism: Near-endemic

## NYCTAGINACEAE

*Boerhavia deserticola* Codd

Status: LR-lc

Endemism: Endemic

Distribution: North-West, North-West-Central

*Boerhavia repens* L.

Status: LR-lc

## NYMPHAEACEAE

*Nymphaea lotus* L.

Status: LR-lc

## OLACACEAE

*Olex dissitiflora* Oliv.

Status: LR-lc

Distribution: North-West

*Ximenia americana* L. var. *americana*

Status: LR-lc

*Ximenia caffra* Sond. var. *natalensis*

Status: LR-lc

Endemism: Near-endemic

## OLEACEAE

*Schrebera trichoclada* Welw.

Status: LR-lc

Distribution: Caprivi

## OPIACEAE

*Opilia campestris* Engl. var. *campestris*

Status: LR-lc

## ORCHIDACEAE

*Eulophia speciosa* (R.Br. ex Lindl.) Bolus

Status: LR-lc

Threats: Collection

Distribution: North-Central, East

Few to many plants may be seen in local colonies.

Flowers very attractive. Hos ethnobotanical value.

*Habenaria armatissima* Rchb.f.

Status: LR-lc

Threats: Collection

Distribution: North-Central, North-East

## PASSIFLORACEAE

*Adenia repanda* (Burch.) Engl.

Status: LR-lc

## PEDALIACEAE

*Harpagophytum procumbens* (Burch.) DC. ex

Meisn. subsp. *procumbens*

Status: LR-cd

*Rogeria bigibbosa* Engl.

Status: LR-lc

Endemism: Endemic

Distribution: Central

*Rogeria longiflora* (Royaen) J.Gay ex DC.

Status: LR-lc

*Sesamothamnus benguellensis* Welw.

Status: LR-lc

Endemism: Near-endemic

Distribution: North-West

*Sesamothamnus guerichii* (Engl.) E.A.Bruce

Status: LR-lc

Endemism: Near-endemic



*Sesamum abbreviatum* Merxm.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Sesamum angalense* Welw.  
Status: LR-lc

*Sesamum capense* Burm.f.  
Status: LR-lc

*Sesamum marlathii* Engl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Sesamum rigidum* Peyr. subsp. *merenskyanum*  
Ihlenf. & Seidenst.  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: North

*Sesamum schinzianum* Asch.  
Status: LR-lc  
Endemism: Near-endemic

PLUMBAGINACEAE

*Plumbago pearsanii* L.Balus  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central to South

POACEAE

*Eragrostis arenicala* C.E.Hubb.  
Status: LR-lc

*Eragrostis patens* Oliv.  
Status: LR-lc

*Eragrostis walteri* Pilg.  
Status: LR-lc  
Endemism: Endemic  
Distribution: South

*Pennisetum faermeranum* Leeke  
Status: LR-lc  
Endemism: Endemic  
Distribution: North

*Paganarthria leiathra* Hack.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Setaria homonyma* (Steud.) Chiav.  
Status: LR-lc

*Stipagrostis damarensis* (Mez) De Winter  
Status: LR-lc  
Endemism: Endemic  
Distribution: North to Central

*Stipagrostis garubensis* (Pilg.) De Winter  
Status: LR-lc  
Endemism: Endemic  
Distribution: South

*Stipagrostis gonatostachys* (Pilg.) De Winter  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central to South

*Stipagrostis hermannii* (Mez) De Winter  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide

*Stipagrostis hochstetteriana* (L.C.Beck ex Hack.)  
De Winter var. *hochstetteriana*  
Status: LR-lc

Endemism: Near-endemic  
Distribution: wide

*Stipagrostis namibensis* De Winter  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Stipagrostis sabulicola* (Pilg.) De Winter  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central to South

POLYGALACEAE

*Palygala guerichiana* Engl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide

PORTULACACEAE

*Anacampseras albissima* Marloth  
Status: LR-lc

*Ceraria fruticulosa* H.Pearsan & Stephens  
Status: LR-lc  
Endemism: Near-endemic

*Ceraria langipedunculata* Merxm. & Padlech  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-East

*Ceraria namaquensis* (Sond.) H.Pearson & Stephens  
Status: LR-lc  
Endemism: Near-endemic

*Portulaca faliata* Ker Gawl.  
Status: LR-lc

*Portulacaria armiana* van Jaarsv.  
Status: LR-lc  
Endemism: Near-endemic

PTAEROXYLACEAE

*Ptaeraxylon obliquum* (Thunb.) Radlk.  
Status: LR-lc

RUBIACEAE

*Amphiasma divaricatum* (Engl.) Bremek.  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide

*Amphiasma merenskyanum* Bremek.  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West, North-Central, Central

*Kahautia azurea* (Dinter & K.Krause) Bremek.  
Status: LR-lc  
Endemism: Endemic  
Distribution: North, wide

RUTACEAE

*Citrapsis daweanae* Swingle  
Status: LR-lc  
Distribution: Caprivi  
Armed shrub. Limited to riverine vegetation. Is utilised.

SANTALACEAE

*Osyris lanceolata* Hachst. & Steud.  
Status: LR-lc

*Thesium xeraphyiticum* A.W.Hill  
Status: LR-nt  
Endemism: Endemic  
Distribution: Central  
Not collected since 1977.

SCROPHULARIACEAE

*Antherothamnus pearsonii* N.E.Br  
Status: LR-lc

*Anticharis ebracteata* Schinz  
Status: LR-lc  
Endemism: Endemic  
Distribution: West

*Anticharis imbricata* Schinz  
Status: LR-lc  
Endemism: Endemic  
Distribution: South-West-Central

*Anticharis inflata* Marlath & Engl.  
Status: LR-lc  
Endemism: Endemic

*Aptosimum arenarium* Engl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: wide  
Seems to be on slopes of mountains.

*Aptosimum suberosum* Weber  
Status: LR-nt  
Endemism: Endemic  
Threats: Grazing/browsing  
Distribution: North-Central  
Perennial herb forms carpets. Limited distribution that could be affected by over-stocking of game.

*Craterostigma plantagineum* Hachst.  
Status: LR-lc

*Hiernia angalensis* S.Maare  
Status: LR-lc  
Endemism: Near-endemic

*Jamesbrittenia megadenia* Hilliard  
Status: LR-lc  
Endemism: Near-endemic  
Distribution: South-Central

*Manulea dubia* (Skan) Overkatt ex Raessler  
Status: LR-lc  
Endemism: Endemic  
Distribution: North-West-Central, Central, South-West, South-East

*Manulea gariepina* Benth.  
Status: LR-lc  
Distribution: South

*Manulea namibensis* (Roessler) Hilliard  
Status: LR-lc  
Endemism: Endemic  
Threats: Mining  
Distribution: South-West

*Manuleopsis dinteri* Thell.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Central

*Nemesia fruticans* (Thunb.) Benth.  
Status: LR-lc

*Phyllopodium hispidulum* (Thell.) Hilliard  
**Status:** LR-nt  
 Endemism: Endemic?  
 Distribution: South-West

## SELAGINACEAE

*Selago albomarginata* Hilliard  
**Status:** LR-ic  
 Distribution: East

*Selago alopecuroides* Rolfe  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Distribution: Central

*Selago amboensis* Rolfe  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: Central

*Selago dinteri* Rolfe subsp. *dinteri*  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Distribution: Central

*Selago divaricata* L.f.  
**Status:** LR-ic

*Selago kurtzdinteri* Hilliard  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Distribution: Central  
*LR-nt may be a better assessment, as it prefers oreos around ponds, which are often trampled. It is widespread.*

## SOLANACEAE

*Lycium grandicalyx* Joubert & Venter  
**Status:** LR-ic  
 Endemism: Endemic  
 Distribution: South-West, South-East

*Solanum dinteri* Bitter  
**Status:** LR-ic  
 Endemism: Endemic  
 Distribution: Central

*Solanum rigescentoides* Hutch.  
**Status:** LR-ic  
 Endemism: Endemic  
 Distribution: wide

## STERCULIACEAE

*Dombeya rotundifolia* (Hochst.) Planch. var. *rotundifolia*  
**Status:** LR-ic

*Hermannia amabilis* Marloth ex K.Schum.  
**Status:** LR-ic  
 Endemism: Endemic  
 Distribution: North-West, Central

*Sterculia africana* (Lour.) Fiori  
**Status:** LR-ic

## TECOPHILAEACEAE

*Cyanella amboensis* Schinz  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: North-West-Central

## TILIACEAE

*Corchorus merxmuelleri* Wild  
**Status:** LR-ic  
 Endemism: Endemic  
 Distribution: North-West-Central

*Grewia falcistipula* K.Schum.  
**Status:** LR-ic  
*Fruits edible.*

## URTICACEAE

*Forsskaolea candida* L.f.  
**Status:** LR-ic

*Forsskaolea hereroensis* Schinz  
**Status:** LR-ic  
 Endemism: Near-endemic

*Forsskaolea viridis* Ehrenb. ex Webb  
**Status:** LR-ic

*Obetia carruthersiana* (Hiern) Rendle  
**Status:** LR-ic  
 Endemism: Near-endemic

## VAHLIACEAE

*Vahlia capensis* (L.f.) Thunb. subsp. *capensis*  
**Status:** LR-ic  
 Endemism: Near-endemic

## VERBENACEAE

*Lantana dinteri* Moldenke  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Distribution: North (wide)

## VISCACEAE

*Viscum capense* L.f.  
**Status:** LR-ic  
 Distribution: South  
*Shrubland, usually coastal and riverine. Various hosts.*

*Viscum rotundifolium* L.f.  
**Status:** LR-ic  
 Distribution: West, Central

*Viscum schaeferi* Engl. & K.Krause  
**Status:** LR-ic  
*Dry woodland and mixed bushveld.*

*Viscum tuberculatum* A.Rich.  
**Status:** LR-ic

## VITACEAE

*Cyphostemma cirrhosum* (Thunb.) Desc. ex Wild & R.B.Drumm. subsp. *transvaalense* (Szyszyl.) C.A.Sm.  
**Status:** LR-nt  
 Threats: Habitat degradation  
 Distribution: North-East

*Cyphostemma congestum* (Baker) Desc. ex Wild & R.B.Drumm.  
**Status:** LR-ic  
 Distribution: West, North-Central

*Cyphostemma currorii* (Hook.f.) Desc.  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Threats: Collection, habitat degradation  
 Distribution: North-West, Central

*Cyphostemma hereroense* (Schinz) Desc. ex Wild & R.B.Drumm.  
**Status:** LR-ic

*Cyphostemma omburense* (Gilg & M.Brandt) Desc.  
**Status:** LR-ic  
 Endemism: Endemic  
 Distribution: North-West

*Cyphostemma ruacanense* (Exell & Mendonça) Desc.  
**Status:** LR-nt  
 Distribution: North-West  
*Has ethnobotanical use.*

*Cyphostemma sandersonii* (Harv.) Desc.  
**Status:** LR-nt  
 Threats: Habitat degradation  
 Distribution: North-Central, East  
*Has ethnobotanical use.*

*Cyphostemma uter* (Exell & Mendonça) Desc.  
**Status:** LR-nt  
 Endemism: Near-endemic  
 Threats: Habitat degradation, collection  
 Distribution: North-West  
*No young plants were seen in field.*

## WELWITSCHIACEAE

*Welwitschia mirabilis* Hook.f.  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Distribution: North-West-Central, North-West

## ZYGOPHYLLACEAE

*Fagonia isotricha* Murb. var. *spinescens* (Schwartz) Hadidi  
**Status:** LR-ic  
 Endemism: Near-endemic

*Sisyndite spartea* E.Mey. ex Sond.  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Distribution: South

*Zygophyllum applanatum* Van Zyl  
**Status:** LR-nt  
 Endemism: Endemic  
 Threats: Grazing/browsing  
*Limited distribution in mainly winter rainfall area. Seedlings and young plants seen. Populations of hundreds of plants are seen where no grazing occurs.*

*Zygophyllum clavatum* Schltr. & Diels  
**Status:** LR-ic  
 Endemism: Near-endemic  
 Distribution: West

*Zygophyllum cordifolium* L.f.  
**Status:** LR-ic  
 Distribution: wide  
*Large subpopulations; wide distribution.*

*Zygophyllum cretaceum* Van Zyl ined.  
**Status:** LR-nt  
 Endemism: Near-endemic  
 Distribution: South-West  
*Limited distribution, scattered individuals.*

*Zygophyllum cylindrifolium* Schinz  
**Status:** LR-ic  
 Endemism: Endemic  
 Distribution: North-West, North-West-Central  
*Grazing damage is minimal.*



***Zygophyllum decumbens* Delile var. *decumbens***

**Status:** LR-lc

Endemism: Near-endemic

Distribution: South

Widespread, large populations with many individuals from young to old.

***Zygophyllum hirticaule* Van Zyl**

**Status:** LR-nt

Endemism: Endemic

Threats: Grazing/browsing

Large subpopulations with seedlings and juveniles seen.

Needs further collecting.

***Zygophyllum leptopetalum* E.Mey.ex Sond.**

**Status:** LR-nt

Threats: Grazing/browsing

Distribution: South

Scattered individuals over large areas; palatable.

***Zygophyllum leucocladum* Schltr. & Diels**

**Status:** LR-nt

Endemism: Near-endemic

Threats: Grazing/browsing

Distribution: South

***Zygophyllum longicapsulare* Schinz**

**Status:** LR-lc

Endemism: Near-endemic

Distribution: South-West

Grazing damage negligible. Large populations and scattered individuals occur.

***Zygophyllum longistipulatum* Schinz**

**Status:** LR-nt

Endemism: Endemic

Distribution: South-Central

Limited distribution, small populations, individuals scattered, young and seedlings are rare.

***Zygophyllum microcarpum* Cham.**

**Status:** LR-lc

Endemism: Near-endemic

Distribution: South

Probably not palatable, as grazing damage is rare.

Occurs in large subpopulations that are widespread.

***Zygophyllum margsana* L.**

**Status:** LR-nt

Threats: Grazing/browsing

Distribution: South

***Zygophyllum patenticaule* Van Zyl ined.**

**Status:** LR-nt

Endemism: Near-endemic

Distribution: South-West

Restricted distribution. Large subpopulations with hundreds of individuals.

***Zygophyllum prismatocarpum* E.Mey. ex Sond.**

**Status:** LR-lc

Endemism: Near-endemic

Distribution: South-West, South-West-Central

Seedlings and juveniles present.

***Zygophyllum pubescens* Schinz**

**Status:** LR-lc

Distribution: South

Young and seedlings are rare.

***Zygophyllum retrofractum* Thunb.**

**Status:** LR-lc

Endemism: Near-endemic

Distribution: South

***Zygophyllum rigidum* Schinz**

**Status:** LR-lc

Endemism: Near-endemic

Large subpopulations with many young plants and seedlings; many scattered individuals.

***Zygophyllum simplex* L.**

**Status:** LR-lc

Endemism: Near-endemic

***Zygophyllum spongiosum* Van Zyl ined.**

**Status:** LR-lc

Endemism: Near-endemic

***Zygophyllum stapffii* Schinz**

**Status:** LR-lc

Endemism: Endemic

Distribution: North-West to South-West-Central

Small and large subpopulations; no grazing.

***Zygophyllum tenue* P.E.Glover**

**Status:** LR-lc

Endemism: Near-endemic

Threats: Grazing/browsing

Distribution: South

Young individuals seen.



***Ferraria schaefferi* is listed as *Vulnerable*.**

(Photo: G. Owen-Smith)



**Landscape view in Namibia, Ondjamu Hill.**

(Photo: E. Marais & A.H. Kirk-Spriggs)

## ACANTHACEAE

*Asystasia schimperii* T.Anderson  
Status: DD  
Taxonomically uncertain.

*Asystasia welwitschii* S.Moore  
Status: DD  
Endemism: Near-endemic  
Distribution: North-West  
Not collected since the 1960s. Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Barleria megalosiphon* Mildbr.  
Status: DD  
Distribution: Caprivi  
Known from one specimen collected in 1959, but widespread or well-known elsewhere.

*Barleria prionitis* L. subsp. *ameliae* (A.Meeuse)  
Brummitt & Wood  
Status: DD  
Taxonomically uncertain.

*Bllepharis macra* (Nees) Vollesen  
Status: DD  
Endemism: Near-endemic  
Distribution: South-West  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Petalidium spiniferum* C.B.Clarke  
Status: DD  
Endemism: Near-endemic  
Distribution: North-West  
Taxonomically uncertain.

*Ruellia otaviensis* P.G.Mey.  
Status: DD

## AIZOACEAE

*Galenia fallax* Pax  
Status: DD  
Endemism: Near-endemic  
Distribution: South-West  
Known from one collection in 1908 only. Taxonomically uncertain.

*Plinthus rehmannii* G.Schellenb.  
Status: DD  
Known from one collection in 1956.

*Tetragonia rangeana* Engl.  
Status: DD  
Endemism: Endemic  
Distribution: South-West  
Known from the type and two additional specimens.

## ALLIACEAE

*Tulbaghia tenuior* K.Krause & Dinter  
Status: DD

## AMARANTHACEAE

*Sericocoma avolans* Fenzl  
Status: DD  
Taxonomically uncertain.

*Sericocoma pungens* Fenzl  
Status: DD  
Endemism: Near-endemic  
Taxonomically uncertain.

## AMARYLLIDACEAE

*Brunsvigia radula* (Jacq.) Aiton  
Status: DD  
Distribution: South-East

*Crinum baumii* Harms  
Status: DD  
Distribution: North-East  
Taxonomically uncertain.

*Crinum carolo-schmidtii* Dinter  
Status: DD  
Endemism: Near-endemic  
Taxonomically uncertain.

*Crinum euchraphyllum* I.Verd.  
Status: DD  
Taxonomically uncertain.

*Crinum parvibulosum* Dinter ex Overkott  
Status: DD  
Taxonomically uncertain.

*Crinum rautanenianum* Schinz  
Status: DD  
Endemism: Endemic  
Distribution: North-Central  
Taxonomically uncertain.

*Crinum subcernuum* Baker  
Status: DD  
Taxonomically uncertain.

*Crinum zeylanicum* (L.) L.  
Status: DD  
Taxonomically uncertain.

*Cybistetes longifolia* (L.) Milne-Redh. & Schweick.  
Status: DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Cyrtanthus herrei* (F.M.Leight.) R.A.Dyer  
Status: DD  
Endemism: Near-endemic

*Haemanthus namaquensis* R.A.Dyer  
Status: DD  
Endemism: Near-endemic  
Distribution: South-West

*Haemanthus pubescens* L.f. subsp. *arenicola*  
Snijman  
Status: DD  
Endemism: Near-endemic  
Distribution: South-West

*Nerine duparquetiana* (Baill.) Baker  
Status: DD

*Nerine pusilla* Dinter  
Status: DD  
Endemism: Endemic  
Distribution: South-West-Central, South-West

*Scadoxo multiflorus* (Martyn) Raf. subsp. *katharinae* (Baker) Friis & Nordal  
Status: DD  
Distribution: North-West  
Known from one collection only.

## ANACARDIACEAE

*Lannea schweinfurthii* (Engl.) Engl. var. *tomentosa* (Dunkley) Kokwaro  
Status: DD

Distribution: North-East  
Known from one collection only.

*Lannea schweinfurthii* (Engl.) Engl. var. *stuhlmannii* (Engl.) Kokwaro  
Status: DD  
Known from the type or a very limited number of specimens only.

*Ozoroa insignis* Delile subsp. *latifolia* (Engl.) R.Fern.  
Status: DD  
Known from two collections only.

*Ozoroa okavangensis* R.R. & A.Fern.  
Status: DD  
Endemism: Endemic?  
Distribution: North-East border

## APIACEAE

*Heteromorpha arborescens* (Spreng.) Cham. & Schltdl. var. *frutescens* P.J.D.Winter  
Status: DD  
Has ethnobotanical use.

## APOCYNACEAE

*Adenium oleifolium* Stapf  
Status: DD  
Distribution: South-East  
Known from one specimen in Namibia, but widespread or well-known elsewhere. Not yet confirmed to occur in Namibia.

*Brachystelma codonanthum* Bruyns  
Status: DD  
Endemism: Endemic  
Threats: Collection  
Distribution: North-East  
Known from one specimen only. Not yet confirmed to occur in Namibia.

*Brachystelma recurvatum* Bruyns  
Status: DD  
Endemism: Endemic  
Threats: Collection  
Distribution: Central  
Known from one specimen only. Not yet confirmed to occur in Namibia.

*Ceropegia floribunda* N.E.Br.  
Status: DD  
Threats: Collection  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Ceropegia occidentalis* R.A.Dyer  
Status: DD  
Threats: Collection

*Cynanchum gerrardii* (Harvey) Liede  
Status: DD  
Threats: Collection  
Distribution: Caprivi  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Cynanchum schistoglossum* Schltr.  
Status: DD  
Known from two collections only, but widespread or well-known elsewhere.

*Duvalia caespitosa* (Masson) Haw. var. *caespitosa*  
Status: DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.



*Fockea multiflora* K.Schum.

Status: DD  
Threats: Collection  
Distribution: North

*Hoodia officinalis* (N.E.Br.) Plowes subsp. *officinalis*

Status: DD  
Threats: Collection  
Not yet confirmed to occur in Namibia.

*Huernia levyi* Oberm.

Status: DD  
Threats: Collection  
Distribution: Caprivi  
Known from only one collection in 1959 from a limited area.

*Huernia namaquensis* Pillans

Status: DD  
Threats: Collection  
Not yet confirmed to occur in Namibia.

*Huernia thuretii* Cels

Status: DD  
Threats: Collection -  
Recorded from one area that is very disjunct from other populations and has never been found again.  
Taxonomically uncertain.

*Huernia urceolata* L.C.Leach

Status: DD  
Endemism: Near-endemic  
Threats: Collection  
Distribution: North-West  
Known from two collections only. Taxonomically uncertain.

*Huernia verekeri* Stent. var. *verekeri*

Status: DD  
Threats: Habitat degradation, urban expansion, collection  
Distribution: North-West  
Not yet confirmed to occur in Namibia.

*Huernia zebrina* N.E.Br. subsp. *magniflora*

(Phillips) L.C.Leach  
Status: DD  
Threats: Collection  
Not yet confirmed to occur in Namibia.

*Orbea albocastanea* (Marloth) Bruyns

Status: DD  
Endemism: Endemic  
Threats: Collection  
Distribution: South-East  
Taxon under revision.

*Orbea huillensis* (Hiern) Bruyns subsp. *flava*

Bruyns  
Status: DD  
Threats: Collection  
Taxon under revision.

*Orbea lugardii* (N.E.Br.) Bruyns

Status: DD  
Threats: Collection  
Taxon under revision.

*Orbea lutea* (N.E.Br.) Bruyns subsp. *vaga*

(N.E.Br.) Bruyns  
Status: DD  
Threats: Collection  
Taxon under revision.

*Orbea maculata* (N.E.Br.) L.C.Leach subsp. *kaokoensis*

Bruyns  
Status: DD  
Threats: Collection  
Taxon under revision.

*Orbea maculata* (N.E.Br.) L.C.Leach subsp. *rangeana* (Dinter & A.Berger) Bruyns

Status: DD

Endemism: Endemic  
Threats: Collection  
Taxon under revision.

*Orbea schweinfurthii* (A.Berger) Bruyns

Status: DD  
Threats: Collection  
Taxon under revision.

*Orbea valida* (N.E.Br.) Bruyns subsp. *occidentalis*

Bruyns  
Status: DD  
Threats: Collection  
Taxon under revision.

*Pachycarpus lineolatus* (Decne.) Bullock

Status: DD  
Distribution: North-East  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Piarranthus decipiens* (N.E.Br.) Bruyns

Status: DD  
Threats: Collection  
Taxonomically uncertain. Not yet confirmed to occur in Namibia.

*Stapelia hirsuta* L.

Status: DD  
Threats: Collection  
Taxonomically uncertain. Not yet confirmed to occur in Namibia.

*Stapelia schinzii* A.Berger & Schltr. var. *angolensis*

Kers  
Status: DD  
Endemism: Near-endemic  
Threats: Collection  
Not yet confirmed to occur in Namibia.

*Stapelia schinzii* A.Berger & Schltr. var. *bergeriana*

(Dinter) L.C.Leach  
Status: DD  
Endemism: Endemic  
Threats: Collection

*Stapeliopsis urniflora* Lavrans

Status: DD  
Endemism: Endemic?  
Threats: Collection  
Distribution: South-Central  
Taxon under revision.

*Strophanthus kombe* Oliv.

Status: DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Tromotriche aperta* (Masson) Bruyns

Status: DD  
Endemism: Near-endemic  
Threats: Collection, mining  
Distribution: South-West  
Known from one locality only.

## ASPHODELACEAE

*Aloe melanacantha* A.Berger

Status: DD  
Threats: Mining, collection  
Distribution: South-West  
Rare in Namibia, could be confused with *Aloe erinacea*.  
Taxonomically uncertain. Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Bulbine tetraphylla* Dinter

Status: DD  
Endemism: Endemic  
Threats: Mining, collection  
Distribution: South

*Trachyandra glandulosa* (Dinter) Oberm.

Status: DD  
Endemism: Endemic  
Distribution: South-West  
Known from type collected in 1931 and one disjunct specimen.

*Trachyandra lanata* (Dinter) Oberm.

Status: DD  
Endemism: Endemic  
Distribution: South-West

## ASTERACEAE

*Chrysocoma microphylla* Thunb.

Status: DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Dicoma capensis* Less.

Status: DD  
Taxon under revision.

*Dicoma cuneneensis* Wild

Status: DD  
Endemism: Endemic?  
Distribution: North-West  
Taxon under revision.

*Dicoma dinteri* S.Moore

Status: DD  
Endemism: Endemic  
Distribution: Central  
Taxon under revision.

*Dicoma sessiliflora* Harv. subsp. *sessiliflora* var.

*membranacea* (S.Moore) S.Ortiz & Rodr.Oubina  
Status: DD  
Taxon under revision.

*Distephanus angolensis* (O.Hoffman) H.Rob. &

B.Kahn  
Status: DD  
Distribution: North-West

*Distephanus divaricatus* (Steetz) H.Rob. & B.Kahn

Status: DD  
Taxonomically uncertain.

*Hirpicium gorterioides* (Oliv. & Hiern) Roessler

subsp. *schinzii* (O.Hoffm) Roessler  
Status: DD  
Endemism: Near-endemic  
Distribution: North-East  
Taxonomically uncertain.

*Nicolasia heterophylla* S.Moore subsp. *affinis*

(S.Moore) Merxm.  
Status: DD  
Endemism: Endemic  
Distribution: Central  
Taxonomically uncertain.

*Nicolasia heterophylla* S.Moore subsp.

*heterophylla*  
Status: DD  
Endemism: Endemic  
Distribution: Central

*Nicolasia nitens* (O.Hoffm.) Eyles

Status: DD  
Known from a few disjunct collections only.

*Nicolasia pedunculata* S.Moore

Status: DD

*Nicolasia stenoptera* (O.Hoffm.) Merxm. subsp.

*makarikariensis* (Bremer & Oberm.) Merxm.  
Status: DD  
Taxonomically uncertain.

*Nicolasia stenaptera* (O.Hoffm.) Merxm. subsp. *stenaptera*  
**Status:** DD  
*Taxonomically uncertain.*

*Nidorella resedifolia* DC. subsp. *frutescens* Merxm.  
**Status:** DD  
 Distribution: North

*Nalletia tenuifolia* Mattf.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: Central  
*Toxonomically uncertain.*

*Osteaspermum armatum* Norl  
**Status:** DD  
 Endemism: Near-endemic  
 Distribution: South  
*Only known from two specimens collected in the 1960s and 1970s.*

*Pentatrachia rehmsii* (Merxm.) Merxm.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: Central  
*Known from type only. Toxonomically uncertain.*

*Pterania rangei* Muschl.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: South-West  
*Not yet confirmed to occur in Namibia.*

*Sphaeranthus epigaeus* Schinz  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North-Central  
*Occurs in dense stands of grass and may have declined due to overgrazing. Toxonomically uncertain.*

*Sphaeranthus wattii* Giess ex Merxm.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North-Central  
*Known from type specimen only, collected in 1958. Toxonomically uncertain.*

*Vernania glabra* (Steetz) Vatke var. *ondongensis* (Klatt) Merxm.  
**Status:** DD  
 Endemism: Endemic?  
*Toxonomically uncertain.*

## BORAGINACEAE

*Cardia pilasissima* Baker  
**Status:** DD  
 Distribution: Caprivi  
*Taxon under revision.*

## BRASSICACEAE

*Heliophila caranapifolia* L.  
**Status:** DD  
 Distribution: South-West  
*Presence in Namibia needs confirmation.*

*Sisymbrium burchellii* DC. var. *dinteri* (O.E.Schulz) Marais  
**Status:** DD  
 Endemism: Near-endemic  
 Distribution: Central  
*Known from one collection in 1940s. Toxonomically uncertain.*

*Sisymbrium dissitiflorum* O.E.Schulz  
**Status:** DD  
 Endemism: Near-endemic  
*Known from one specimen in Namibia, but widespread or well-known elsewhere. Not yet confirmed to occur in Namibia.*

## BURSERACEAE

*Cammiphora mossambicensis* (Oliv.) Engl.  
**Status:** DD  
 Distribution: Caprivi  
*Known from one specimen collected in 1959. Widespread or well-known elsewhere.*

*Commiphora viminea* Burtt Davy  
**Status:** DD  
*Toxonomically uncertain.*

## CAMPANULACEAE

*Wahlenbergia densicaulis* Brehmer  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: Central  
*Not collected since 1963, but may be overlooked in the years it is present. Toxonomically uncertain.*

*Wahlenbergia subumbellata* Markgr.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: South-West  
*Not yet confirmed to occur in Namibia.*

## CHENOPODIACEAE

*Chenopodium ambanum* (Murr) Aellen  
**Status:** DD  
 Endemism: Endemic  
 Distribution: wide

*Exomis micraphylla* (Thunb.) Aellen var. *micraphylla*  
**Status:** DD  
*Toxonomically uncertain. Not yet confirmed to occur in Namibia.*

*Suaeda merxmuelieri* Aellen  
**Status:** DD  
 Endemism: Endemic?  
*Only four collections prior to the 1960s. Confused with S. fruticosa.*

## COMBRETACEAE

*Cambretum callinum* Fresen. subsp. *suluense* (Engl. & Diels) Okafor  
**Status:** DD  
*Seems to be along northern rivers from west to east.*

*Cambretum oxystachyum* Welw. ex M.A.Lawson  
**Status:** DD  
 Distribution: North-West

*Cambretum schumannii* Engl.  
**Status:** DD  
*Has ethnobotanical use.*

## CRASSULACEAE

*Adramischus schuldianus* (Poelln.) Poelln. subsp. *juttae* (Poelln.) Toelken  
**Status:** DD  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: disjunct

*Adromischus schuldianus* (Poelln.) Poelln. subsp. *schuldianus*  
**Status:** DD  
 Endemism: Endemic  
 Threats: Collection  
*Toxonomically uncertain.*

*Crassula ausensis* Hutchison subsp. *titanopsis* Pavelka  
**Status:** DD  
 Endemism: Endemic  
 Threats: Collection  
 Distribution: South-East  
*Known from one locality only. Toxonomically uncertain.*

*Crassula calumnaris* Thunb. subsp. *prolifera* Friedrich  
**Status:** DD  
 Distribution: South-West  
*Toxonomically uncertain. Not yet confirmed to occur in Namibia.*

*Crassula carallina* Thunb. subsp. *macrorrhiza* Toelken  
**Status:** DD  
 Endemism: Near-endemic  
*Not yet confirmed to occur in Namibia.*

*Crassula deceptar* Schonland & Baker f.  
**Status:** DD  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-West  
*Grows solitary or in colonies, usually on white quartzite; good camouflage. Uprooted by goat hooves. Needs collecting. Toxonomically uncertain.*

*Crassula deltoidea* Thunb.  
**Status:** DD  
*Toxonomically uncertain.*

*Crassula dependens* Bolus  
**Status:** DD  
 Distribution: Central  
*Known from one specimen in Namibia, but widespread or well-known elsewhere.*

*Crassula exilis* Harv. subsp. *sedifolia* (N.E.Br.) Toelken  
**Status:** DD  
 Endemism: Near-endemic  
 Threats: Collection  
*Tiny cushion plants in rock crevices. Known from one specimen in Namibia, but widespread or well-known elsewhere.*

*Crassula grisea* Schonland  
**Status:** DD  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-West  
*Known from type or very limited number of specimens only.*

*Crassula mesembrianthemopsis* Dinter  
**Status:** DD  
 Endemism: Near-endemic  
 Threats: Collection  
 Distribution: South-West-Central, South-West, South-East  
*Collector's item from winter rainfall region. Toxonomically uncertain.*

*Crassula namaquensis* Schonland & Baker f. subsp. *lutea* (Schonland) Toelken  
**Status:** DD

*Crassula pallens* Schonland & Baker f.  
**Status:** DD  
 Endemism: Near-endemic  
 Distribution: South-West  
*Known from type or very limited number of specimens only.*

*Crassula rudolfii* Schonland & Baker f.  
**Status:** DD

*Kalanchoe laciniata* (L.) DC.  
**Status:** DD  
 Distribution: North-West



Known from only one specimen in Namibia, but widespread or well-known elsewhere. Since the specimen was collected in 1957, the area has been transformed.

***Tylecodon bleckiae* G.Will.**

**Status:** DD  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
In rock crevices on southwest-facing slopes in shade; confused with *T. buchholzianus*.

***Tylecodon pearsonii* (Schonland) Toelken**

**Status:** DD  
Endemism: Near-endemic  
Not yet confirmed to occur in Namibia.

***Tylecodon reticulatus* (L.f.) Toelken subsp. reticulatus**

**Status:** DD  
Known from limited area only.

***Tylecodon similis* (Toelken) Toelken**

**Status:** DD  
Endemism: Near-endemic  
Distribution: South-West  
Known from literature, but no specimen. Not yet confirmed to occur in Namibia.

**CUCURBITACEAE**

***Cucumis humifructus* Stent**

**Status:** DD

**DIOSCOREACEAE**

***Dioscorea asteriscus* Burkil**

**Status:** DD  
Threats: Collection  
Tuber is eaten, may be undercollected. Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Dioscorea cochleari-apiculatus* De Wild.**

**Status:** DD  
Threats: Collection  
Distribution: Caprivi  
Known from one specimen in Namibia (1969), but widespread or well-known elsewhere.

***Dioscorea dregeana* (Kunth) Dur. & Schinz**

**Status:** DD  
Threats: Collection  
Distribution: Caprivi  
Known from one specimen in Namibia (1959), but widespread or well-known elsewhere.

***Dioscorea elephantipes* (L'Hér.) Engl.**

**Status:** DD  
Threats: Collection  
Known from three collections in Namibia only, but widespread or well-known elsewhere.

***Dioscorea hemicypta* Burkill**

**Status:** DD  
Threats: Collection  
Distribution: South-Central  
Known from one specimen in Namibia (1988), but widespread or well-known elsewhere.

***Dioscorea hirtiflora* Benth.**

**Status:** DD  
Threats: Collection  
Distribution: North-East, Caprivi  
Only known from two specimens collected in 1956 and 1959. Widespread or well-known elsewhere.

***Dioscorea quartiniana* A.Rich.**

**Status:** DD  
Threats: Collection  
Distribution: North-East

Four specimens collected in the 1950s. Widespread or well-known elsewhere.

**EBENACEAE**

***Diospyros batocana* Hiern**

**Status:** DD  
Distribution: Caprivi  
Known from type or very limited number of specimens only.

**ERIOSPERMACEAE**

***Eriospermum graniticolum* Dinter ex Poelln.**

**Status:** DD  
Endemism: Endemic  
Distribution: South-West

***Eriospermum namaquanum* Marloth ex P.L.Perry**

**Status:** DD  
Endemism: Near-endemic

***Eriospermum parvifolium* Jacq.**

**Status:** DD  
Endemism: Near-endemic

***Eriospermum volkmanniae* Dinter**

**Status:** DD  
Endemism: Endemic  
Distribution: Central  
Dolomite rocks, altitude 1,700 m. Probably more widespread.

**ERYTHROXYLACEAE**

***Erythroxylum zambesiaceum* N.Robson**

**Status:** DD  
Distribution: Caprivi

**EUPHORBIACEAE**

***Bridelia mollis* Hutch.**

**Status:** DD  
Known from one collection only. Not yet confirmed to occur in Namibia.

***Bridelia tenuifolia* Mull.Arg.**

**Status:** DD  
Distribution: North-West  
Known from two collections only.

***Croton pseudopulchellus* Pax**

**Status:** DD  
Distribution: North-East  
Known from one collection only.

***Euphorbia baliola* N.E.Br.**

**Status:** DD  
Endemism: Endemic  
Threats: Collection  
Distribution: South-East  
Known from type only, collected in 1912.

***Euphorbia benthamii* Hiern**

**Status:** DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia brachiata* E.Mey. ex Boiss.**

**Status:** DD  
Threats: Collection  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia burmannii* E.Mey. ex Boiss.**

**Status:** DD  
Threats: Collection  
Distribution: South-West

Known only from the literature; no specimen. Taxonomically uncertain.

***Euphorbia congestiflora* L.C.Leach**

**Status:** DD  
Endemism: Near-endemic  
Distribution: North-West  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia ephedroides* E.Mey. ex Boiss. var. debilis**

**L.C.Leach**  
**Status:** DD  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West

***Euphorbia espinosa* Pax**

**Status:** DD  
Threats: Collection  
Taxonomically uncertain.

***Euphorbia fusca* Marloth**

**Status:** DD  
Threats: Collection  
Only known collection from about 1932. Taxonomically uncertain.

***Euphorbia hottentota* Marloth**

**Status:** DD  
Endemism: Near-endemic  
Threats: Collection  
Not collected for 70 years, but could be due to confusion with *E. virosa* and because it is difficult to press. Taxonomically uncertain. Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia ingens* E.Mey. ex Boiss.**

**Status:** DD  
Threats: Habitat degradation  
Known from very few collections.

***Euphorbia karroensis* (Boiss) N.E.Br.**

**Status:** DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia matabelensis* Pax**

**Status:** DD  
Threats: Collection  
Taxonomically uncertain.

***Euphorbia pseudoduseimata* A.C.White, R.A.Dyer & B.Sloane**

**Status:** DD  
Endemism: Endemic  
Threats: Collection  
Known from type or very limited number of specimens only.

***Euphorbia silicicola* Dinter**

**Status:** DD  
Endemism: Endemic  
Taxonomically uncertain.

***Euphorbia spartaria* N.E.Br.**

**Status:** DD  
Endemism: Endemic  
Distribution: Central  
Not yet confirmed to occur in Namibia.

***Euphorbia stapelioides* Boiss.**

**Status:** DD  
Endemism: Near-endemic  
Threats: Mining, collection  
Distribution: South-West  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia venenata* Marloth**

**Status:** DD  
Endemism: Endemic  
Threats: Collection

Distribution: North-Central  
Taxonomically uncertain.

**Euphorbia valkmonnioe Dinter**

Status: DD

Endemism: Endemic

Known from two collections in 1925 and 1928 only.

Taxonomically uncertain.

**Excoecaria bussei (Pax) Pax**

Status: DD

Distribution: Caprivi

Known from two collections only in 1969 and 1975.

**Jatropha decumbens Pax & K.Hoffm.**

Status: DD

Endemism: Endemic

Distribution: North-East

## FABACEAE

**Acacia hebecloido DC. subsp. chobiensis (O.B.Mill.)**

A.Schreib.

Status: DD

Distribution: North-East

Known from one specimen in Namibia, but widespread or well-known elsewhere.

**Bolusio amboensis (Schinz) Harms**

Status: DD

Endemism: Endemic

Distribution: North-Central, North-East

**Crotalaria ourea Dinter ex Baker f.**

Status: DD

Endemism: Endemic

Distribution: Central

Annual on mountain slopes, not collected since 1974—  
o very good rain year.

**Cratalaria kurtii Schinz**

Status: DD

Endemism: Endemic

Distribution: Central

Taxonomically uncertain.

**Dolbergia martinii F.White**

Status: DD

Known from one collection in 1959 only.

**Dalbergia nitidula Welw. ex Baker**

Status: DD

Distribution: North

Not yet confirmed to occur in Namibia.

**Elephantarrhiza gaetzei (Harms) Harms subsp. gaetzei**

Status: DD

Distribution: North-East

**Elephantorrhiza schinziana Dinter**

Status: DD

Endemism: Endemic

Distribution: North-Central

Probably confused with *E. suffruticosa* and may be more widespread. Occurs on upper mountain slopes. Known from type or very limited number of specimens only.

**Indigofera giessii A.Schreib.**

Status: DD

Endemism: Endemic

Distribution: North-Central to East

Leaves and seeds used for dye.

**Lebeckia abavata Schinz**

Status: DD

Endemism: Endemic

Distribution: Central

Fairly widespread in central parts, but may be misidentified. Taxonomically uncertain.

**Lessertia cryptantha Dinter**

Status: DD

Endemism: Endemic

Distribution: South-West

Known from type only; collected in 1922.

**Latananias lineorifolia B.-E.van Wyk**

Status: DD

Probably overlooked, few disjunct localities known.

**Latananias moculoto Dummer**

Status: DD

Distribution: South

Poorly known species. Taxonomically uncertain.

**Latananias pallidiflorae Dinter & Harms**

Status: DD

Endemism: Endemic

Distribution: Central

Taxonomically uncertain.

**Pericapsis angalensis (Baker) Van Meeuwen**

Status: DD

**Tephrosia griseola H.M.L.Forbes**

Status: DD

Endemism: Endemic

Distribution: North-West-Central

Taxonomically uncertain.

**Tephrosia pallida H.M.L.Forbes**

Status: DD

Endemism: Endemic

Distribution: North-West-Central

Known from type specimen only.

## HYACINTHACEAE

**Albuca korosbergensis P.E.Glover**

Status: DD

Endemism: Endemic

Distribution: South-West-Central, Central

Known from two very disjunct specimens only. Taxon under revision.

**Albuca reflexa Dinter & K.Krause**

Status: DD

Endemism: Endemic

Distribution: North-East

Taxon under revision.

**Lachenolia pearsonii (P.E.Glover) W.F.Barker**

Status: DD

Endemism: Endemic

Distribution: South-West

Known from type or very limited number of specimens only.

**Ledebauria scabrida Jessop**

Status: DD

Endemism: Endemic

Found in two disjunct areas at different times. Probably undercollected.

**Massania echinata L.f.**

Status: DD

Endemism: Near-endemic

Distribution: South-West

Known from one collection only.

**Neapatersonia falcata G.J.Lewis**

Status: DD

Endemism: Near-endemic

Known from type and one collection in 1992.

**Ornithogolum opertum (I.Verd.) Oberm.**

Status: DD

Known from one collection only.

**Ornithogolum hispidum Hornem. subsp. hispidum**

Status: DD

Distribution: South-West

**Ornithogolum prasinum Lindl.**

Status: DD

Distribution: East-Central

Known from very few specimens.

**Ornithogolum setifolium Kunth**

Status: DD

**Ornithogolum subcorioceum L.Bolus**

Status: DD

Distribution: South-West

Known from one collection only.

**Ornithogolum tenuifolium F.Delaroche**

Status: DD

**Whiteheadia bifolia (Jacq.) Baker**

Status: DD

Endemism: Near-endemic

## HYPOXIDACEAE

**Hypoxis dinteri Nel**

Status: DD

Endemism: Endemic?

Distribution: North-East, Caprivi

Taxon under revision.

## IRIDACEAE

**Babiano nomoquensis Baker**

Status: DD

Endemism: Near-endemic

**Moroee pollido (L.Bolus) Goldblatt**

Status: DD

**Moroee rigidifolia Goldblatt**

Status: DD

Endemism: Endemic

Distribution: South-West

Known from one site only.

## LAMIACEAE

**Aeallanthus nomibensis Ryding**

Status: DD

Endemism: Endemic

Distribution: North-West, North-West-Central

Probably undercollected; only three localities known.

## LORANTHACEAE

**Tapinanthus mallissimus (Engl.) Danser**

Status: DD

Endemism: Near-endemic

Distribution: North-Central

Occurs on various hosts. Not yet confirmed to occur in Namibia.

## MELIACEAE

**Entondrophragma coudotum (Sprague) Sprague**

Status: DD

Distribution: Caprivi

Only three collections.

**Entondrophragma spicatum (C.DC.) Sprague**

Status: DD

Endemism: Near-endemic

Distribution: North

Has ethnobotanical use. Known from one specimen in Namibia, but widespread or well-known elsewhere.



## MESEMBRYANTHEACEAE

*Conophytum marginatum* Lavis var. *littlewoodii* (L.Bolus) Rawe  
Status: DD4  
Threats: Collection  
Distribution: South-East  
Only found once in the wild to the north end of Goodhouse Poort; exists in cultivation.

*Conophytum ricardianum* Loesch & Tischer subsp. *rubiflorum* Tischer  
Status: DD  
Endemism: Endemic  
Threats: Habitat degradation, mining, collection  
Distribution: South-West

*Conophytum wettsteinii* (A.Berger) N.E.Br. subsp. *ruschii* (Schwantes) S.A.Hammer  
Status: DD  
Threats: Collection

*Dracophilus dealbatus* (N.E.Br.) Walgate  
Status: DD3 4  
Endemism: Near-endemic  
Threats: Habitat degradation, mining, agriculture, collection  
Distribution: South-West

*Dracophilus delaetianus* (Dinter) Dinter & Schwantes  
Status: DD  
Endemism: Endemic  
Threats: Collection  
Distribution: South-West  
Taxonomically uncertain.

*Drosanthemum nordenstamii* L.Bolus  
Status: DD  
Endemism: Endemic  
Taxonomically uncertain.

*Eberlanzia cyathiformis* (L.Bolus) H.E.K.Hartmann  
Status: DD  
Threats: Mining, collection  
Distribution: South-West

*Eberlanzia ebracteata* (L.Bolus) H.E.K.Hartmann  
Status: DD  
Threats: Mining, collection  
Distribution: South-West  
Known from type or very limited number of specimens only.

*Juttadinteria albata* L.Bolus  
Status: DD1 4  
Endemism: Near-endemic  
Threats: Habitat degradation, mining  
Distribution: South-West

*Juttadinteria attenuata* Walgate  
Status: DD3  
Endemism: Endemic  
Distribution: South

*Juttadinteria ausensis* (L.Bolus) Schwantes  
Status: DD2  
Endemism: Endemic  
Threats: Habitat degradation, mining, collection  
Distribution: South-West  
Only recorded once.

*Juttadinteria elizae* (Dinter & A.Berger) L.Bolus  
Status: DD3  
Endemism: Near-endemic

*Malephora crocea* (Jacq.) Schwantes var. *purpureo-crocea* (Haw.) H.Jacobsen & Schwantes  
Status: DD  
Endemism: Near-endemic  
Restricted distribution.

*Namibia pomonae* (Dinter) Dinter & Schwantes  
Status: DD3  
Endemism: Endemic  
Threats: Habitat degradation, mining, collection  
Distribution: South-West  
Known from one locality only.

*Namibia ponderosa* (Dinter & Schwantes) Dinter & Schwantes  
Status: DD3  
Endemism: Endemic

*Psammophora longifolia* L.Bolus  
Status: DD3  
Endemism: Endemic  
Threats: Habitat degradation, mining, collection  
Distribution: South-West  
Restricted distribution with five subpopulations, but may be undercollected.

*Ruschia namusmontana* Friedrich  
Status: DD  
Endemism: Endemic  
Taxonomically uncertain.

*Ruschianthus falcatus* L.Bolus  
Status: DD  
Endemism: Endemic

*Stoeberia carpii* Friedrich  
Status: DD  
Endemism: Near-endemic

## MOLLUGINACEAE

*Corbichonia rubrivioleacea* (Friedrich) Jeffrey  
Status: DD  
Endemism: Endemic  
Distribution: South-West-Central, South-East

## MORACEAE

*Ficus ingens* (Miq.) Miq.  
Status: DD  
Distribution: North-West

*Ficus verruculosa* Warb.  
Status: DD  
Taxonomically uncertain.

## NYCTAGINACEAE

*Commicarpus decipiens* Meikle  
Status: DD  
Endemism: Endemic  
Distribution: wide

## ORCHIDACEAE

*Eulophia fridericii* (Rchb.f.) A.V.Hall  
Status: DD  
Threats: Collection  
Distribution: North-East  
Very rare; little is known about its distribution.  
Attractive flowers. Lost collected in 1956. Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Eulophia schweinfurthii* Kraenzl.  
Status: DD  
Threats: Collection  
Distribution: North-East, Caprivi  
Attractive flower. Not collected after 1966. Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Habenaria rautaneniana* Kraenzl.  
Status: DD  
Threats: Collection

Distribution: North-Central  
Known from type or very limited number of specimens only.

*Habenaria subarmata* Rchb.f.  
Status: DD  
Threats: Collection  
Distribution: North-Central, North-East  
Flowers are pretty but small. Not collected since 1976. Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Holothrix villosa* Lindl.  
Status: DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

## OXALIDACEAE

*Oxalis extensa* Salter  
Status: DD  
Endemism: Near-endemic  
Distribution: South-West  
Taxonomically uncertain.

*Oxalis laxicaulis* R.Knuth  
Status: DD  
Endemism: Near-endemic  
Distribution: South-West  
Taxonomically uncertain.

*Oxalis pseudo-cernua* R.Knuth  
Status: DD  
Endemism: Endemic  
Distribution: South-West

## POACEAE

*Dregeochloa pumila* (Nees) Conert  
Status: DD  
Endemism: Near-endemic

*Eragrostis habrantha* Rendle  
Status: DD  
Known from one collection in 1913. Widespread or well-known elsewhere.

*Eragrostis sclerantha* Nees subsp. *villosipes* (Jedwabn.) Launert  
Status: DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Leptochloa uniflora* A.Rich.  
Status: DD  
Distribution: Caprivi  
Known from three collections 30 to 40 years ago. Widespread or well-known elsewhere.

*Tetrapogon tenellus* (Roxb.) Chiov.  
Status: DD  
Distribution: North-Central  
Known from four collections in one oreo only. Widespread or well-known elsewhere.

## POLYGALACEAE

*Polygala lasiosepala* Levyns  
Status: DD

## PROTEACEAE

*Protea gaguei* J.F.Gmel.  
Status: DD  
Threats: Harvesting  
Distribution: North-East

## RUBIACEAE

*Canthium glaucum* Hiern subsp. *frangula* (S.Moore) Bridson var. *frangula*  
Status: DD  
Distribution: Caprivi  
Known from three disjunct collections only.

*Feretia aeruginescens* Stapf  
Status: DD  
Distribution: North-East  
Known from type or very limited number of specimens only.

*Gardenia resiniflua* Hiern subsp. *resiniflua*  
Status: DD  
Distribution: Caprivi

*Gardenia ternifolia* Schumacher & Thonn. subsp. *jovis-tonantis* (Welw.) Verdc. var. *jovis-tonantis*  
Status: DD  
Distribution: Caprivi  
Not collected since 1945.

*Kohautia amboensis* (Schinz) Bremek.  
Status: DD  
Endemism: Endemic  
Distribution: North-East  
Taxonomically uncertain.

## SANTALACEAE

*Thesium megalocarpum* A.W.Hill  
Status: DD  
Endemism: Near-endemic  
Taxonomically uncertain.

## SAPINDACEAE

*Erythrophysa alata* (Eckl. & Zeyh.) Hutch.  
Status: DD  
Distribution: South-West-Central  
Only three specimens.

## SCROPHULARIACEAE

*Alectra pseudobarleriae* (Dinter) Dinter  
Status: DD  
Endemism: Endemic

*Apotosimum albomarginatum* Marloth & Engl.  
Status: DD  
Taxonomically uncertain.

*Apotosimum angustifolium* Weber & Schinz  
Status: DD  
Endemism: Near-endemic  
Taxonomically uncertain.

*Apotosimum glandulosum* Weber & Schinz  
Status: DD  
Endemism: Near-endemic  
Distribution: wide  
Taxonomically uncertain.

*Manulea tenella* Hilliard  
Status: DD  
Endemism: Endemic  
Distribution: East-Central  
Poorly known, with meagre collections. Taxonomically uncertain.

## SELAGINACEAE

*Selago angolensis* Rolfe  
Status: DD  
Distribution: North-East  
Known from one specimen only. Taxonomically uncertain.

*Selago angustibractea* Hilliard  
Status: DD  
Endemism: Near-endemic  
Distribution: South-West  
Misidentified in the post. May hybridise with *S. lepida*.

*Selago centralis* Hilliard  
Status: DD  
Known from one collection in 1913 only.

*Selago dinteri* Rolfe subsp. *pseudodinteri* Hilliard  
Status: DD  
Endemism: Near-endemic  
Distribution: wide  
Widespread in Namibia with disjunct distribution.

*Selago welwitschii* Rolfe var. *australis* Hilliard  
Status: DD

## SELAGINELLACEAE

*Selaginella imbricata* (Forssk.) Spring ex Decne.  
Status: DD  
Threats: Damming  
Distribution: North-West  
Known from five specimens from one oreo only.

## SOLANACEAE

*Solanum damarense* Bitter  
Status: DD  
Endemism: Endemic  
Distribution: North-West  
Taxonomically uncertain.

## TILIACEAE

*Grewia inaequilatera* Garcke  
Status: DD  
Distribution: Caprivi

*Grewia monticola* Sond.  
Status: DD  
Distribution: Caprivi  
Known from type or very limited number of specimens only.

*Grewia pachycalyx* K.Schum.  
Status: DD  
Distribution: Caprivi

*Grewia subspathulata* N.E.Br.  
Status: DD

## VISCACEAE

*Viscum dielsianum* Dinter ex Neusser  
Status: DD  
Endemism: Near-endemic  
Distribution: South-Central

*Viscum menyharthii* Engl. & Schinz  
Status: DD  
Distribution: North-West-Central  
Woodland and riverine.

## VITACEAE

*Cyphostemma borensse* (Klotzsch) Desc. ex Wild & R.B.Drumm.  
Status: DD  
Threats: agriculture  
Distribution: Caprivi  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

*Cyphostemma puberulum* (C.A.Sm.) Wild & R.B.Drumm.  
Status: DD  
Known from one specimen in Namibia, but widespread or well-known elsewhere.

## ZYGOPHYLLACEAE

*Zygophyllum chrysopteron* Retief  
Status: DD  
Endemism: Near-endemic  
Distribution: South  
Palatable. Known from one specimen only, but widespread or well-known elsewhere.



A magnificently sized specimen of the widespread *Pterocarpus angolensis* (Photo: B. Curtis)



*Eremothamnus marlothianus* is threatened owing to mining. (Photo: G. Williamson)



# South Africa



Janine E. Victor\*

## Introduction

To date, 3,268 species have been recorded as "threatened with extinction" in South Africa (Hilton-Taylor 1996a). This new Red Data List (RDL) is an attempt to provide updated assessments according to the 1994 IUCN system as a starting point from which progress can be made. It is important to realise that the list presented here is preliminary and can therefore only be used in conjunction with Hilton-Taylor (1996a, b, 1997) and should not be seen as a replacement. Only 949 (about 25%) of the taxa listed by Hilton-Taylor (1996a, b, 1997) have so far been updated. Where possible, whole families were completed, but in four cases (Aizoaceae, Apocynaceae, Aloaceae, and Asteraceae), only parts of the families are complete. Genera within these four families are, however, complete.

Since the main contributors to the RDL were systematists with research knowledge of their particular taxonomic groups, a taxonomic, rather than geographic, approach was adopted for the compilation of the RDL. Although it is incomplete, I hope that this RDL will show clear trends that will be similar to the final, complete RDL.

The *Red Data List of southern African plants* (Hilton-Taylor 1996a, b, 1997) lists provincial assessments (Cape, Orange Free State, Natal and Transvaal) for each geopolitical area, along with national and global RDL assessments. The assessments in this new list are at the national level, but are obviously also global assessments where taxa are endemic to South Africa. Provincial assessments are not provided in this account of the South African RDL, because of the artificial nature of demarcating natural areas according to political boundaries.

## Methods

The approach taken towards producing a new RDL for South Africa within a limited

period was to elicit co-operation from as many people as possible. National workshops were held to give potential collaborators an overview of the methodology of the IUCN (1994) system of assessing conservation status. The anticipated outcome of these workshops was to equip people with the knowledge required to provide useful information for the RDL. After these training workshops, I undertook follow-up visits with individual collaborators so that the information could be consolidated.

The following procedures were conducted for each taxonomic group:

- The names of the taxa already assessed in each taxonomic group included in this list were obtained from the SARARES database, an electronic version of Hilton-Taylor (1996a, b, 1997). This database is a compilation of plant species on the RDL, their assessments and accompanying notes, and is available on the SABONET website (<http://www.sabonet.org/reddatalist/database.html>).
- Nomenclatural updates were made. The most up-to-date scientifically correct names were provided by each specialist according to the latest revisions. These names match those used in the PRECIS database at the National Herbarium, Pretoria (PRE).
- Label information of all plant species collected in South Africa that are housed in PRE and stored in PRECIS provided distribution information to supplement data used in the assessments.
- Distributions were updated according to the new provincial boundaries.
- Additions (new or previously overlooked taxa) were incorporated.

## Results and Discussion

A total of 948 taxa were assessed, of which 414 are threatened with extinction (Table 1). Most species fall into the *Vulnerable* (VU) category; some 270 of these (81%)

**Capital:** Pretoria (administrative capital), Cape Town (legislative capital)

**Area:** 1,220,088 km<sup>2</sup>

**Languages:** English, Xhosa, Zulu, Afrikaans, Ndebele, North Sotho, Sesotho, Swazi, Tsonga, Tswana, Venda (all official)

**Currency:** Rand

**Total plant species:** 23,420

**Total plant endemics:** no available information

**Total RDL plants:** 948

**Focal RDL institutions:** PRE

**Number of Protected Areas:** About 18 National Parks, including two Transfrontier Parks (Lesotho–South Africa and Mozambique–South Africa–Zimbabwe), numerous other protected areas, and several proposed protected areas (including Transfrontier Parks).

**Population:** 42,106,200 **Growth Rate:** 1.7% **Density:** 33.3 people/km<sup>2</sup>

**Phytogeography:** Cape in the south and southwest, Karoo–Namib in the west, Kalahari–Highveld Regional Transitional Zone in the centre, Zambezi elements in the north and east, Afromontane patches scattered in enclaves, and Tonga–Pondoland Regional Mosaic along the eastern coast.

**Flora:** Fynbos and its variants in the southwest, arid (Succulent Karoo) and semi-arid karoo shrubland and grassy shrubland in northern and central Cape, highveld grassland over much of the central plateau, open savanna woodland on the eastern plateau, montane forest and grasslands in enclaves, savanna and low-lying forest on the east coast.

**Sources:** Anonymous 2000, Cowling & Hilton-Taylor 1994, Low & Rebelo 1996

\*National Herbarium, Pretoria, South Africa

are classified according to the D2 criterion, based on a narrow distribution area. Many species known only from their type localities—some of which may not even be taxonomically valid—fall into this category. It is expected that the number of species classified in this category will be reduced as future taxonomic work clarifies uncertainty or additional populations of rare species are discovered. *Data Deficient* (DD) listings are almost always due to taxonomic uncertainty.

#### Comparison of the RDL Assessments

As the new IUCN system is designed to target species that are going extinct rather than simply rare, many species previously listed as *Rare* (R) or *Insufficiently Known* (K) (Hilton-Taylor 1996a, b, 1997) are now listed as *Lower Risk* or VU D. The old R and K categories were applied to taxa with narrow distribution ranges and when populations were not known to be in decline or increasing; on the other hand, in this RDL compilation, only exceptionally narrowly restricted taxa qualify (and only as VU D) if the populations are stable, otherwise the *Lower-Risk* category applies.

Another important comparison is that taxa previously assessed as *Endangered* (E) have often been re-assessed as CR or EN, and those previously assigned as V are now usually EN or VU. Taxa previously listed as I have often been re-assessed as VU. The few *Critically Endangered* assessments are usually due to a continuing decline coupled with an extremely small distribution area.

#### Trends

The most commonly used criteria for assessing plant taxa are the B and D criteria, since these are based on size of distribution range rather than population num-

bers, the latter being very difficult to estimate for plants. Criterion D was used in cases where no decline was known; Criterion B was usually used in cases where an ongoing decline was suspected.

For each family assessed so far, there are fewer DDs than there were of the equivalent K and I categories in Hilton-Taylor's work. For example, in the Rutaceae there are now ten taxa listed as DD, whereas in Hilton-Taylor (1996a) seven taxa were listed as K and seven as I; this is because the IUCN (1994) system forces one to make a decision based on a minimum amount of available data. Estimating the exact extent of distribution has been problematic for the compilation of this RDL and thus, when no reasonable estimate could be made, the distribution was taken as the maximum area the species could reasonably inhabit. Then, if there was any reason to suspect a continuing decline to the population, Criterion B was applied.

#### Threatening Processes

So far, the major threats to the survival of the threatened species in South Africa appear to be agricultural activities that have historically done the most damage (in the grassland and lowland fynbos biomes), and at present, ongoing urbanisation. Whereas agricultural threats now operate on a much smaller scale than before, as most arable land is already transformed, harvesting of medicinal plants is on the increase because of greater accessibility (better roads and transport), growing population, and increase in economic potential. However, the effects of harvesting for medicinal purposes operate on a smaller scale and are often (but not always) targeted towards more common species. Very few medicinal plants have been assessed in this RDL compilation, and once this has been done, one

would be able to more fully interpret the effects of harvesting.

Illegal collecting for commercial trade is targeted towards specific taxonomic groups. It is still the main threat faced by sought-after groups such as cycads and many succulent groups, but fortunately, other taxa such as aloes are in relieve.

#### Conclusion

This RDL is far from complete and ongoing collaboration with specialists in a wide variety of fields is necessary to fill the present voids. Systematic researchers have proven to be very knowledgeable and have contributed greatly towards the first phase of the new RDL, but more co-operation from specialists with regional knowledge (conservationists, ecologists, and so forth) and knowledge in other disciplines (ethnobotany) is required to ensure the compilation of a comprehensive RDL.

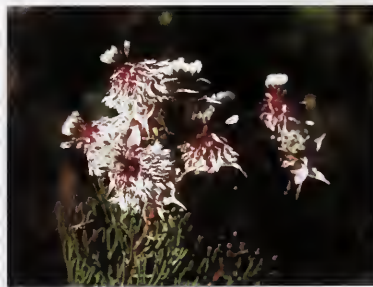
Constant updating of information is necessary, requiring continual communication with the experts. Co-operation and communication are therefore vital for the success of the RDL, and to ensure the survival of South Africa's threatened plants.

**Citation** Taxonomic groups in the following list were assessed by the specialists who are currently most actively involved in researching or curating each group. When citing information pertaining to assessments of a particular family, the citation should list the family author in addition to J.E Victor, for example, for the Cyperaceae, the correct citation is Archer, C. & Victor, J.E. 2002. Cyperaceae. In: J.S. Golding (ed.), Southern African Plant Red Data Lists. SABONET Report No 14: 100. C. Archer (Cyperaceae), J. Beyers (Thymelaeaceae), C.L. Bredenkamp (Thymelaeaceae), N. Govender (Gentianaceae), S.A. Hammer (Aizoaceae *pro parte*), P.P.J. Herman (Asteraaceae *pro parte*), H. Kurzweil (Orchidaceae), B. Liltved (Orchidaceae), R. Peckover (Apocynaceae *pro parte*), P.B. Phillipson (Lobeliaceae), G.F. Smith (Aloaceae *pro parte*), Y. Singh (Apocynaceae *pro parte*), D. Snijman (Amaryllidaceae and Hypoxidaceae), T. Trinder-Smith (Rutaceae), H.J.T. Venter (Apocynaceae *pro parte*), W.G. Welman (Campanulaceae, Convolvulaceae, Cucurbitaceae, Dipsacaceae and Solanaceae), and C. Whitehouse (Rosaceae).

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**Table 1. Number of taxa in each RDL category in South Africa.**

RDL status	Number of taxa
Extinct (EX)	15
Critically Endangered (CR)	19
Endangered (EN)	58
Vulnerable (VU)	322
Lower-Risk near threatened (LR-nt)	92
Lower-Risk least concern (LR-lc)	334
Data Deficient (DD)	108
<b>Total</b>	<b>948</b>



***Serruria aemula*, found growing on acid sands in fynbos, is categorised as *Endangered*. (Hilton-Taylor, 1996a) (Photo J.S. Golding)**



# EXTINCT & THREATENED

## AIZOACEAE

*Conophytum achabense* S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: Northern Cape

*Conophytum acutum* L.Bolus

Status: VU D2

Endemism: Endemic

Threats: Collection, grazing, habitat degradation

Distribution: Western Cape

If the decline is irreversible, the assessment will change to Endangered. Known to be illegally collected.

*Conophytum auriflorum* Tischer subsp.

*turbiniforme* (Rawé) S.A.Hammer

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

*Conophytum burgeri* L.Bolus

Status: VU D2

Endemism: Endemic

Threats: Collection, mining

Distribution: Northern Cape

Well-established in cultivation. Known to be roided by collectors, in which case probably CR or EN.

*Conophytum herreanthus* S.A.Hammer subsp. *herreanthus*

Status: CR A1acdB1B2abceC2bd1

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Probably extinct now. Known to be illegally collected.

*Conophytum phoeniceum* S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Road network

Distribution: Northern Cape

Collection low because established horticulturally and easy to grow.

*Conophytum roodiae* N.E.Br. subsp. *sanguineum* (S.A.Hammer) T.C.Smale

*Conophytum rugosum* S.A.Hammer subsp. *sanguineum*

S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Trompling due to grazing activity is a threat.

*Conophytum schlechteri* Schwantes

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

*Conophytum semivestitum* L.Bolus

Status: EX

Endemism: Endemic

Threats: Mining

Distribution: Northern Cape

*Conophytum smorenskaduense* de Boer subsp. *hermarium* S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Affected by trampling.

*Conophytum smorenskaduense* de Boer subsp. *smorenskaduense*

Status: VU D2

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Affected by trampling.

*Conophytum uviforme* (Haw.) N.E.Br. subsp. *subincanum* (Tischer) S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: Western Cape

*Conophytum vanheerdei* Tischer

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

## ALOACEAE

*Aloe albidia* (Stapf) Reynolds

Status: VU A1c

Endemism: Endemic

Threats: Fire, collection

Distribution: Mpumalanga

Restricted distribution in mist belt near Borberton.

Known to be illegally collected.

*Aloe bowiea* Schult.f.

Status: CR A1aceB1B2abcde

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Eastern Cape

Will remain at only one location when Coego harbour is completed.

*Aloe brevifolia* Mill.

Status: VU A1c

Endemism: Endemic

Distribution: Western Cape

*Aloe buhrii* Lavranos

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

*Aloe chlorantha* Lavranos

Status: EN B1B2e

Endemism: Endemic

Distribution: Northern Cape

*Aloe comosa* Marl. & A.Berg

Status: VU B1B2c

Endemism: Endemic

Distribution: Western Cape, Northern Cape

*Aloe dabenorisana* van Jaarsv.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

*Aloe distans* Haw.

Status: EN B1B2e

Endemism: Endemic

Distribution: Western Cape

*Aloe fouriei* D.S.Hardy & Glen

Status: VU D2

Endemism: Endemic

Distribution: Mpumalanga

*Aloe gerstneri* Reynolds

Status: VU B1B2abce

Endemism: Endemic

Distribution: KwaZulu-Natal

*Aloe hardyi* Glen

Status: VU D2

Endemism: Endemic

Distribution: Mpumalanga

This species is safe because of its inaccessible habitat.

*Aloe inconspicua* Flowes

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

*Aloe khamiesensis* Pillans

Status: VU B1B2e

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Mountainous region of Namaqualand; threatened by illegal collection.

*Aloe longistylia* Baker

Status: VU A1acd

Endemism: Endemic

Threats: Collection, grazing

Distribution: Western Cape, Eastern Cape

Known to be illegally collected.

*Aloe meyeri* van Jaarsv.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

*Aloe micracantha* Haw.

Status: VU A1aceB1B2ac

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation

Distribution: Eastern Cape

Grossy fynbos, Uniondale to Grahamstown. Threatened by agriculture and urbanisation.

*Aloe monotropa* Verdoorn

Status: VU D2

Endemism: Endemic

Threats: Mining, collection

Distribution: Limpopo Province

Known to be illegally collected.

*Aloe nubigena* Groenewald

Status: VU D2

Endemism: Endemic

Distribution: Mpumalanga

*Aloe pearsonii* Schonland

Status: EN B1B2abce

Endemism: Endemic

Threats: Agriculture, grazing

Distribution: Northern Cape

Many plants, but no recruitment. Trompling due to grazing activity is a threat.

*Aloe peglerae* Schonland

Status: EN A1acdeB1B2bce

Endemism: Endemic

Threats: Collection, habitat degradation

Distribution: Gauteng, North-West

Localised near densely populated areas.

*Aloe petrophila* Pillans

Status: VU D2

Endemism: Endemic

Distribution: Limpopo Province

Cliff dweller.

*Aloe pictifolia* D.S.Hardy

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Safe because of inaccessibility.

*Aloe pillansii* Guthrie

Status: CR A2ace

Threats: Collection, disease

Distribution: Northern Cape  
Bulk of plants grow in herding area, from Eksteenfontein to border of Namibia. Many more dead plants than seedlings. In Namibia, threatened by base metal mining. Predation by porcupines and baboons has been noted. Disease (leaf scorch) has also been reported.

***Aloe pratensis* Baker**

Status: VU B1B2bce  
Endemism: Endemic  
Threats: Agriculture, collection  
Distribution: Eastern Cape, KwaZulu-Natal  
Reported to be collected for medicinal purposes.

***Aloe prinslooii* Verdoorn & Hardy**

Status: VU A1cd  
Endemism: Endemic  
Threats: Collection  
Distribution: KwaZulu-Natal  
Tugelo Basin endemic. Collectors have had severe impacts in the past.

***Aloe pruinosa* Reynolds**

Status: VU A1acdeB1B2abceD2  
Endemism: Endemic  
Threats: Urban expansion, habitat degradation  
Distribution: KwaZulu-Natal

***Aloe ramosissima* Pillans**

Status: VU A1ce  
Endemism: Endemic  
Threats: Grazing  
Distribution: Northern Cape  
Unexploited dead plants near Helshoogte and Helskloof.  
Trampling due to grazing activity is a threat.

***Aloe reitzii* Reynolds var. *reitzii***

Status: VU D2  
Endemism: Endemic  
Distribution: Mpumalanga

***Aloe reitzii* Reynolds var. *vernalis* D.S.Hardy**

Status: VU D2  
Endemism: Endemic  
Distribution: KwaZulu-Natal

***Aloe reynoldsii* Letty**

Status: VU A1cd2  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Eastern Cape

***Aloe saundersiae* (Reynolds) Reynolds**

Status: EN B1B2bcd  
Endemism: Endemic  
Threats: Afforestation, agriculture  
Distribution: KwaZulu-Natal

***Aloe simii* Pole Evans**

Status: EN B1B2b  
Endemism: Endemic  
Threats: Afforestation, agriculture  
Distribution: Mpumalanga

***Aloe soutpansbergensis* Verdoorn**

Status: VU B1B2be  
Endemism: Endemic  
Threats: Collection  
Distribution: Limpopo Province

***Aloe striata* Haw. var. *komaggasensis* (Kritzing)**

& van Jaarsv.) Glen & D.S.Hardy  
Status: VU D2  
Endemism: Endemic  
Threats: Collection, grazing  
Distribution: Northern Cape

***Aloe thompsoniae* Groenewald**

Status: EN B1B2e  
Endemism: Endemic  
Threats: Collection  
Distribution: Limpopo Province

***Aloe thorncroftii* Pole Evans**

Status: VU D2  
Endemism: Endemic  
Distribution: Mpumalanga

***Aloe vossii* Reynolds**

Status: EN B1B2bcde  
Endemism: Endemic  
Threats: Alien plant infestation, fire, grazing/browsing  
Distribution: Limpopo Province  
Trampling by cattle is a threat.

## AMARYLLIDACEAE

***Amaryllis paradisicola* Snijman**

Status: VU D2  
Endemism: Endemic  
Threats: Browsing  
Distribution: Northern Cape  
Baboons reported to damage fruiting heads.

***Apodolirion cedarbergense* D.Mull.-Doblies**

Status: VU D2  
Endemism: Endemic  
Threats: Browsing  
Distribution: Western Cape  
Flowers are eaten by wild animals.

***Brunsvigia elandsmontana* Snijman**

Status: VU D2  
Endemism: Endemic  
Threats: Grazing/browsing  
Distribution: Western Cape  
Trampling by wild game is a threat.

***Brunsvigia gydobergensis* D. & U.Mull.-Doblies**

Status: EX  
Endemism: Endemic  
Distribution: Western Cape  
This may have been a small-flowered form of the widespread *B. josephinae*.

***Brunsvigia herrei* Leight. ex W.F.Barker**

Status: VU B1B2e  
Threats: Collection, grazing/browsing  
Distribution: Northern Cape  
Trampling by goats is a threat.

***Brunsvigia litoralis* R.A.Dyer**

Status: EN B1B2c  
Endemism: Endemic  
Threats: Urban expansion, habitat degradation  
Distribution: Eastern Cape  
The upright leaves are mowed in coastal gardens, reducing the storage capacity of the bulbs. Coastal development is a threat.

***Brunsvigia radula* Aiton**

Status: EN A2c  
Endemism: Endemic  
Threats: Collection, mining  
Distribution: Northern Cape

***Crinum lineare* L.f.**

Status: VU B1B2abc  
Endemism: Endemic  
Threats: Urban expansion, alien plant infestation  
Distribution: Eastern Cape  
Habitat is becoming degraded.

***Cyrtanthus carneus* Lindl.**

Status: VU D2  
Endemism: Endemic  
Threats: Agriculture, collection  
Distribution: Western Cape  
Populations are never large. The plants grow as a few scattered individuals. Known to be illegally collected.

***Cyrtanthus flammosus* Snijman & van Jaarsv.**

Status: VU D2  
Endemism: Endemic  
Distribution: Eastern Cape

***Cyrtanthus guthrieae* L.Bolus**

Status: VU D2  
Endemism: Endemic  
Threats: Collection, grazing/browsing  
Distribution: Western Cape  
Dependent on fire to flower. Known to be illegally collected. Sheep farming activity is a threat.

***Cyrtanthus leptosiphon* Snijman**

Status: CR B1B2bc  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape  
Depends on fire to flower.

***Cyrtanthus odoratus* Ker Gawl.**

Status: VU D2  
Endemism: Endemic  
Distribution: Western Cape  
Depends on fire to flower. Not often seen.

***Cyrtanthus spiralis* Burch. ex Ker Gawl.**

Status: EN B1B2abc  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Eastern Cape  
Its habitat has become steadily degraded. Habitat degradation evident at most of the known localities. Not easy to cultivate.

***Cyrtanthus suaveolens* Schonland**

Status: EN B1B2abc  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Eastern Cape  
Depends on fire to flower.

***Cyrtanthus wellandii* Snijman**

Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: Eastern Cape  
Known to be illegally collected.

***Gethyllis barkerae* D.Mull.-Doblies**

Status: EN B1B2ce  
Endemism: Endemic  
Threats: Collection, grazing  
Distribution: Western Cape  
The differences between the subspecies do not hold up in recent collections. Coastal development is a threat.

***Gethyllis lata* L.Bolus subsp. *lata***

Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: Western Cape, Northern Cape  
Known to be illegally collected.

***Gethyllis lata* L.Bolus subsp. *orbicularis* D.Mull.-Doblies**

Status: VU D2  
Endemism: Endemic  
Threats: Collection  
Distribution: Northern Cape  
Known to be illegally collected.

***Gethyllis pectinata* D.Mull.-Doblies**

Status: CR B1B2abceC2b  
Endemism: Endemic  
Threats: Collection, grazing  
Distribution: Northern Cape  
Only known from the type locality. Known to be illegally collected. Sheep farming activity is a threat.

***Haemanthus amarylloides* Jacq. subsp.**

***toximontanus* Snijman**  
Status: EN B1B2bc  
Endemism: Endemic  
Threats: Collection, grazing/browsing  
Distribution: Western Cape  
In March 2001 it was noticed that further ploughing near the site had disturbed the drainage system. Known to be illegally collected. Trampling activity is a threat.



***Haemanthus canaliculatus* Levyns****Status:** EN B1B2C1

Endemism: Endemic

Threats: Collection, urban expansion

Distribution: Western Cape

Residential development has been impacting the subpopulation in the last 10 years. Housing development is a threat due to drainage alteration. Illegal collection is a threat.

***Haemanthus graniticus* Snijman****Status:** VU B1B2abc

Endemism: Endemic

Threats: Collection, agriculture

Distribution: Northern Cape

Plagued land is destroying subpopulations in the Kamiesberg. Known to be illegally collected.

***Haemanthus namaquensis* R.A.Dyer****Status:** VU B1B2e

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Known to be illegally collected.

***Haemanthus nartieri* Isaac****Status:** EN B1B2bce

Endemism: Endemic

Threats: Collection, grazing/browsing, road network

Distribution: Western Cape

Known to be illegally collected. Trampling activity is a threat.

***Haemanthus pubescens* L.f. subsp. *leipoldtii***

Snijman

**Status:** VU D2

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

***Haemanthus pumilia* Jacq.****Status:** EN A1acdC1

Endemism: Endemic

Threats: Collection, agriculture

Distribution: Western Cape

Used to occur at base of Klein Drakenstein and Stellenbosch Flats, now locally extinct at these sites. Known to be illegally collected. Wheat farming is considered a threat.

***Hessee cinnamenea* (L'Her.) T.Durand & Schinz****Status:** EN A1ac

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

***Hessee mathewsii* W.F.Barker****Status:** EN B1B2abc

Endemism: Endemic

Threats: Grazing/browsing, urban expansion

Distribution: Western Cape

Major subpopulation at Vredenburg being encroached upon by housing.

***Hessee pusilla* Snijman****Status:** VU D2

Endemism: Endemic

Distribution: Northern Cape

***Hessee tenuipedicellata* Snijman***Hessee* sp. Snijman 1437**Status:** VU D2

Endemism: Endemic

Distribution: Northern Cape

The subpopulation showed disturbance from porcupine digging.

***Hessee undosa* Snijman****Status:** VU D2

Endemism: Endemic

Threats: Desiccation

Distribution: Western Cape

Occur on farmlands in non-arable areas. Extreme drought is reported as a threat.

***Namaquanula bruce-bayeri* D. & U.Mull.-Doblies***Hessee bruce-bayeri* (D. & U.Mull.-Doblies) Snijman**Status:** VU B1B2bc

Threats: Grazing/browsing, mining

Distribution: Northern Cape

Heavy grazing by increasing numbers of goats and diamond mining are reported as threats.

***Nerine gracilis* R.A.Dyer****Status:** VU B1B2abc

Endemism: Endemic

Threats: Erosion, grazing/browsing

Distribution: Mpumalanga, Gauteng

Heavy grazing by domestic stock is considered a problem.

***Nerine huttoniae* Schonland****Status:** VU D2

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Eastern Cape

Habitat reduced due to intensive habitat transformation.

***Nerine marincawitzii* Snijman****Status:** VU D2

Endemism: Endemic

Threats: Erosion, collection

Distribution: Western Cape

A fence has been erected around the subpopulation to exclude domestic stock. Habitat is prone to excessive flooding due to soil erosion in the catchment area.

Bulbs are eaten by baboons.

***Nerine masoniarum* L.Bolus****Status:** EN B1B2ab

Endemism: Endemic

Threats: Habitat degradation, grazing/browsing, urban expansion

Distribution: Eastern Cape

Only a single locality, currently being converted to an urban landscape. Close proximity to informal settlement and grazing by domestic stock are problems.

***Strumaria aestivalis* Snijman****Status:** VU D2

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Known to be illegally collected by bulb enthusiasts.

***Strumaria chaplinii* (W.F.Barker) Snijman****Status:** EN B1B2bc

Endemism: Endemic

Threats: Habitat degradation, urban expansion

Distribution: Western Cape

Degradation of the sites due to proximity to housing.

***Strumaria leipoldtii* (L.Bolus) Snijman****Status:** VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

Locality in close proximity to a refuse dump.

***Strumaria perryae* Snijman****Status:** VU D2

Endemism: Endemic

Distribution: Northern Cape

***Strumaria unguiculata* (W.F.Barker) Snijman****Status:** VU D2

Endemism: Endemic

Threats: Road network, collection

Distribution: Northern Cape

The rarity and large-sized flowers of this species makes it popular with bulb collectors.

## APOCYNACEAE

***Brachystelma caffrum* (Schltr.) N.E.Br.****Status:** CR B1B2abcdC2ab

Endemism: Endemic

Threats: Grazing, habitat degradation

Distribution: Eastern Cape

Striking yellow flowers. Grows with *B. meyerianum*. It could not be found at the type locality. Found in rocky areas where it is safe.

***Brachystelma campanulatum* N.E.Br.****Status:** VU A1c

Endemism: Endemic

Threats: Agriculture

Distribution: Eastern Cape

Large bell-shaped flowers. Found with *B. delicatum*.

More fieldwork needed to ascertain its exact distribution. Cultivation of pineapples and other crops threatens this species.

***Brachystelma dimarphum* R.A.Dyer subsp. *gratum***

R.A.Dyer

**Status:** VU D2

Endemism: Endemic

Distribution: Free State

Possibility that there could be many more sites; potential habitats numerous between Welkom and Bloemfontein.

***Brachystelma discaideum* R.A.Dyer****Status:** VU B1B2bcd

Threats: Urban expansion, agriculture

Distribution: Gauteng, Mpumalanga, North-West

Type locality at Sautpan is now informal settlement.

Related to *B. incanum*.

***Brachystelma dyeri* K.Balkwill & M.Balkwill****Status:** VU D2

Endemism: Endemic

Distribution: Mpumalanga

***Brachystelma franksiae* N.E.Br.****Status:** EN B1B2abcd

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: KwaZulu-Natal

***Brachystelma kerzneri* Peckover****Status:** VU D2

Endemism: Endemic

Threats: Alien plant infestation, habitat degradation

Distribution: Eastern Cape

Lack of fire has transformed community structure of habitat.

***Brachystelma meyerianum* Schltr.****Status:** EN B1B2bcd

Endemism: Endemic

Threats: Grazing, collection

Distribution: Eastern Cape

Closely related to *B. tuberosum* but with yellowish/pinkish flowers. Grows with *B. caffrum*, but the species have different pollinators. Known to be illegally collected.

***Brachystelma moleventi* Peckover & Van Wyk****Status:** VU D2

Endemism: Endemic

Distribution: Eastern Cape

***Brachystelma montanum* R.A.Dyer****Status:** VU D2

Endemism: Endemic

Distribution: Eastern Cape

Probably not threatened (tops of mountains). Flowers similar to *B. occidentale* from Bredasdorp.

***Brachystelma natalense* (Schltr.) N.E.Br.****Status:** VU D2

Endemism: Endemic

Threats: Urban expansion

Distribution: KwaZulu-Natal

***Brachystelma ngamense* R.A.Dyer****Status:** VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

Vegetatively similar to *B. coddii*. Upright bell-shaped

*flower. Non-arable habitat ensures safety from farming activities.*

***Brachystelma occidentale* Schltr.**  
**Status: CR D1**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Western Cape  
*Related to B. delicatum.*

***Brachystelma tenue* R.A.Dyer**  
**Status: EN A1acB1B2abc**  
 Endemism: Endemic  
 Threats: Agriculture, afforestation  
 Distribution: KwaZulu-Natal

***Brachystelma vahrmeijeri* R.A.Dyer**  
**Status: EN A1acB1B2abc**  
 Endemism: Endemic  
 Threats: Agriculture, afforestation  
 Distribution: KwaZulu-Natal

***Ceropegia antennifera* Schltr.**  
**Status: EX**  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal

***Ceropegia cimiciflora* Oberm.**  
**Status: VU A1c**  
 Endemism: Endemic  
 Threats: Agriculture  
 Distribution: KwaZulu-Natal, Limpopo Province  
*Probably two varieties.*

***Ceropegia cynniflora* R.A.Dyer**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal

***Ceropegia decidua* E.A.Bruce subsp. *pretoriensis* R.A.Dyer**  
**Status: CR B1B2bcde**  
 Endemism: Endemic  
 Threats: Alien plant infestation, urban expansion  
 Distribution: Gauteng  
*Housing development is a threat.*

***Ceropegia insignis* R.A.Dyer**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: North-West, Limpopo Province

***Ceropegia radicans* Schltr. subsp. *smithii***  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*May be a hybrid between C. radicans and C. sandersonii.*

***Cryptolepis delagoensis* Schltr.**  
**Status: VU D2**  
 Distribution: KwaZulu-Natal

***Ectadium virgatum* E.Mey.**  
**Status: VU D2**  
 Threats: Agriculture  
 Distribution: Northern Cape

***Mondia whitei* (Hook.f.) Skeels**  
**Status: VU A1dD2**  
 Threats: Collection  
 Distribution: KwaZulu-Natal  
*Used widely and excessively for medicinal purposes.*

***Raphionacme chimanimaniana* Venter & R.L.Verh.**  
**Status: VU D2**  
 Threats: Grazing/browsing  
 Distribution: Limpopo Province  
*Possible trampling and grazing by cattle may be a threat.*

***Raphionacme elsana* Venter & R.L.Verh.**  
**Status: EN B1B2abc**  
 Endemism: Endemic

Threats: Habitat degradation, grazing/browsing, urban expansion  
 Distribution: KwaZulu-Natal  
*Grows in open savanna on red clay. Subsistence farming of crops and activities of cattle and goats are problems.*

***Raphionacme lobulata* Venter & R.L.Verh.**  
**Status: VU D2**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Eastern Cape  
*Banks of the Kop River. Exists in an urban environment.*

***Raphionacme lucens* Venter & R.L.Verh.**  
**Status: EN B1B2bc**  
 Threats: Afforestation  
 Distribution: KwaZulu-Natal  
*Threatened by pine plantations.*

## ASTERACEAE

***Anaxeton angustifolium* Lundgren**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Rocky mountain slopes.*

***Arctotis dregei* Turcz.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape

***Arctotis fosteri* N.E.Br.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape

***Arctotis macrosperma* (DC.) Lewin**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape?

***Aster laevigatus* (Sond.) O.Kuntze**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Only known from type collection; not collected during 20<sup>th</sup> century.*

***Aster nubimontis* Lippert**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Limpopo Province  
*Only known from type collection; collected in 1961.*

***Athanasia capitata* (L.) L.**  
**Status: VU B1B2abc**  
 Endemism: Endemic  
 Distribution: Western Cape  
*It seems to have become very rare, especially on the Cape Peninsula.*

***Athanasia inopinata* (Hutch.) Källersjö**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape

***Athanasia quinqueidentata* Thunb. subsp. *rigens* Källersjö**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape

***Athanasia rugulosa* E.Mey. ex DC.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape

***Athanasia sertulifera* DC.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Grows on dry flats.*

***Athanasia spathulata* (DC.) D.Dietr.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Northern Cape

***Chrysocoma esterhuyseniae* Bayer**  
**Status: VU D2**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Western Cape

***Cotula duckittiae* (L.Bolus) Bremer & Humphries**  
*Cenia duckittiae* L.Bolus  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Already assessed as Endangered in 1971 because of development, agriculture and flower picking for flower shows.*

***Cotula loganii* Hutch.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape?

***Cotula myriophylloides* Harv.**  
**Status: VU D2**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Western Cape

***Cotula paradoxa* Schinz**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape?

***Cotula pedunculata* (Schltr.) Phill.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape

***Dimorphotheca walliana* (Norr) B.Nord.**  
*Osteospermum wallianum* Norr.  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Only known from type collection (1938).*

***Euryops brevipes* B.Nord.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal  
*Only known from type specimen collected in 1956.*

***Euryops ciliatus* B.Nord.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Nat found during the 20<sup>th</sup> century; possibly extinct.*

***Euryops decipiens* Schltr.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Very restricted distribution.*

***Euryops dentatus* B.Nord.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Nat collected again during the 20<sup>th</sup> century; known from only two collections.*

***Euryops gracilipes* B.Nord.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Only known from type collection. Unusual flowering time and inconspicuous habit may be why the species has not been collected more often.*

***Euryops hypnoides* B.Nord.**  
**Status: VU D2**  
 Endemism: Endemic



Distribution: Eastern Cape  
*Restricted distribution.*

**Euryops indecorus B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
*Restricted distribution.*

**Euryops integrifolius B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
*Possibly a high montane derivative of E. munitus.*

**Euryops mirus B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Northern Cape  
*Grows on more or less flat ground in a deep layer of heavy, much granulated clay mixed with sand.*

**Euryops muiirii C.A.Sm.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
*Only known from type collection.*

**Euryops pectinatus (L.) Cass. subsp. lobulatus B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
*Restricted distribution.*

**Euryops pleiodontus B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape?  
*Only known from type specimens; not collected during 20<sup>th</sup> century.*

**Euryops rosulatus B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Northern Cape  
*Rare, restricted distribution.*

**Euryops subcarnosus DC. subsp. minor B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Northern Cape  
*Restricted distribution.*

**Euryops ursinoides B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Eastern Cape

**Euryops virgatus B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Northern Cape  
*Grows in open, flat veld in deep layer of much granulated clay.*

**Euryops zeyheri B.Nord.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape?  
*Exact locality unknown; only known from two collections; not collected during 20<sup>th</sup> century.*

**Felicia annectens (Harv.) Grau**  
**Status:** EX  
Endemism: Endemic  
Distribution: Northern Cape  
*Not collected during the 20<sup>th</sup> century.*

**Felicia deserti Schltr.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Northern Cape

**Felicia diffusa (DC.) Grau subsp. khamiesbergensis Grau**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Northern Cape  
*Only known from type collection.*

**Felicia ebracteata Grau**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Felicia elongata (Thunb.) O.Hoffm.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Felicia esterhuyseniae Grau**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Felicia fruticosa (L.) Nichols. subsp. brevipedunculata (Hutch.) Grau**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Limpopo Province

**Felicia nigrescens Grau**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
*Only known from type collection; not collected during the 20<sup>th</sup> century.*

**Felicia nordenstamii Grau**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Felicia tsitsikamae Grau**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Eastern Cape

**Felicia wrightii Hilliard & B.L.Burt**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: KwaZulu-Natal

**Gnaphalium griquense Hilliard & B.L.Burt**  
**Status:** VU D2  
Distribution: KwaZulu-Natal  
*In damp places.*

**Helichrysum alticolum Bolus**  
**Status:** VU D2  
Endemism: Endemic  
Threats: Alien plant infestation, agriculture, grazing  
Distribution: Eastern Cape

**Helichrysum aureum (Houtt.) Merr. var. argenteum Hilliard**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Mpumalanga, KwaZulu-Natal

**Helichrysum citricephalum Hilliard & B.L.Burt**  
**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Agriculture, afforestation  
Distribution: KwaZulu-Natal  
*Only known locality destroyed by roadworks, could therefore be extinct.*

**Helichrysum fourcadei Hilliard**  
**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture, grazing  
Distribution: Western Cape, Eastern Cape

**Helichrysum haygarthii Bolus**  
**Status:** VU D2  
Endemism: Endemic

Threats: Grazing  
Distribution: Free State, KwaZulu-Natal

**Helichrysum ingomense Hilliard**  
**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture, afforestation  
Distribution: KwaZulu-Natal

**Helichrysum nimbicola Hilliard**  
**Status:** VU D2  
Distribution: Eastern Cape

**Helichrysum solitarium Hilliard**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
*Only known from type collection.*

**Heterolepis mitis (Burm.) DC.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Eastern Cape

**Hippia hirsuta DC.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Inezia speciosa Brusse**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Limpopo Province

**Lasiopogon minutus (B.Nord.) Hilliard & B.L.Burt**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Northern Cape

**Macowania conferta (Benth.) Phillips**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: KwaZulu-Natal

**Macowania deflexa Hilliard & B.L.Burt**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: KwaZulu-Natal

**Macowania hamata Hilliard & B.L.Burt**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: KwaZulu-Natal

**Marasmodes duemmeri Bolus ex Hutch.**  
**Status:** VU D2  
Endemism: Endemic  
Threats: Urban expansion  
Distribution: Western Cape

**Marasmodes oligocephalus DC.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Marasmodes undulata Compton**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Oncosiphon schlechteri (Bolus) Källersjö**  
*Matricaria schlechteri Bolus ex Schltr.*  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Osteospermum aciphyllum DC.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

**Osteospermum elsiae Norl.**  
**Status:** VU D2  
Endemism: Endemic

Distribution: Western Cape

*Osteospermum hafstroemii* Norl

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Osteospermum hirsutum* Thunb.

Status: EX

Endemism: Endemic

Distribution: Western Cape?

*Osteospermum hispidum* Harv. var. *viride* Norl

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Osteospermum pterigoideum* Klatt

Status: VU D2

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

*Othonna cacalioides* L.f.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape, Northern Cape

*Othonna cakilefolia* DC.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Othonna hallii* B.Nord.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Othonna lepidocaulis* Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Othonna membranifolia* DC.

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

*Othonna papaveroides* Hutch.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Othonna patula* Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

*Othonna rechingeri* B.Nord.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

*Othonna spinescens* DC.

Status: VU D2

Endemism: Endemic

*Phymaspermum argenteum* Brusse

Status: VU D2

Endemism: Endemic

Distribution: Limpopo Province

*Phymaspermum erubescens* (Hutch.) Källersjö

Status: VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Eastern Cape

*Phymaspermum villosum* (Hilliard) Källersjö

*Athanasia villosa* Hilliard

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

*Pteronia diosmifolia* Brusse

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Pteronia pillansii* Hutch.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Pteronia scabra* Harv.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Senecio albopunctatus* Bolus

Status: VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Northern Cape

Lost collected in 1883.

*Senecio eminens* Compton

Status: VU D2

Distribution: Mpumalanga

Lost collected in 1949.

*Senecio scaposus* DC. var. *addoensis* (Compton)

G.D.Rowley

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Lost collected in 1933.

*Senecio serrurioides* Turcz.

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Lost collected in 1830.

*Senecio wittebergensis* Compton

Status: VU D2

Endemism: Endemic

Threats: Agriculture, grazing

Distribution: Western Cape

*Steirodiscus schlechteri* Bolus ex Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Steirodiscus speciosus* (Pillans) B.Nord.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Syncarpha recurvata* (L.f.) B.Nord.

*Helichrysum recurvatum* (L.f.) Thunb.

Status: VU D2

Endemism: Endemic

Threats: Urban expansion, harvesting

Distribution: Eastern Cape

Exploited as a cut flower.

*Vellereophyton felinum* Hilliard

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known only from the type collection.

*Vellereophyton lasianthum* (Schltr. & Moeser)

Hilliard

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Vellereophyton pulvinatum* Hilliard

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known only from type collection.

*Vernonia africana* (Sond.) Druce

Status: EX

Endemism: Endemic

Threats: Agriculture, urban expansion

Distribution: KwaZulu-Natal

*Zyrphelis decumbens* (Schltr.) Nesom

*Mairia decumbens* Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

## CAMPANULACEAE

*Roella goodiana* Adamson

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Wahlenbergia brehmeri* Lammers

*Wahlenbergia rotundifolia* Brehmer

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Wahlenbergia microphylla* (Adamson) Lammers

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known from type only.

*Wahlenbergia tetramera* Thulin

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

*Wahlenbergia umbellata* (Adamson) Lammers

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known from type only.

## CUCURBITACEAE

*Acanthosicyos horridus* Welw. ex Hook.f.

Status: VU D2

Distribution: Northern Cape

Edible seeds, exported in the past; Nomo people around Swokopmund utilise this in Nomibio as an important food crop. In Walvis Bay, the lowered water table may affect this species.

*Cucumis humifructus* Stent

Status: EN B1B2abcde

Endemism: Endemic

Threats: Urban expansion

Distribution: Limpopo Province, Gauteng

Also in Tropical Africa. Symbiotic relationship with oordvork. Biology dependent on oordvork, but oordvork population declining.

*Gerrardanthus tomentosus* Hook.f.

Status: VU B1B2bcD2

Distribution: KwaZulu-Natal

## CYPERACEAE

*Carex acocksi* C.Archer

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Only known from type locality, growing in doleritic soil, but could occur on nearby mountains.

*Trianoptiles solitaria* (C.B.Clarke) Levyns

*Ecklonia solitaria* C.B.Clarke

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Recently recorded introduction to Australia.



## HYPOXIDACEAE

**Hypoxis patula** Nel  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Agriculture  
 Distribution: Mpumalanga

**Hypoxis uniflora** Mark.  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Agriculture  
 Distribution: Free State  
*Known only from type locality and collection in 1907.*

**Pauridia longituba** M.F.Thops.  
**Status:** VU B1B2abcd  
 Endemism: Endemic  
 Threats: Urban expansion, habitat degradation  
 Distribution: Western Cape  
*Threatened by ongoing housing development.*

**Spiloxene canaliculata** Garside  
**Status:** VU B1B2abcd  
 Endemism: Endemic  
 Threats: Alien plant infestation, urban expansion  
 Distribution: Western Cape  
*Encroachment of alien grasses is a threat.*

**Spiloxene minuta** (L.) Fourc.  
**Status:** VU B1B2abcd  
 Endemism: Endemic  
 Threats: Urban expansion, habitat degradation  
 Distribution: Western Cape  
*The management of private nature reserves does not always suit the survival of tiny geophytes. Few of the subpopulations recorded in herbario still exist due to urban sprawl.*

**Spiloxene umbraticola** (Schltr.) Garside  
*Spiloxene maximiliani* (Schltr.) Garside  
**Status:** VU B1B2abcd  
 Endemism: Endemic  
 Threats: Agriculture  
 Distribution: Northern Cape, Western Cape

## LOBELIACEAE

**Cyphia salteri** E.Wimm.  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Cyphia stephensiae** E.Wimm.  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Lobelia limosa** (Adamson) F.Wimmer  
**Status:** VU B1B2cd2  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Western Cape

**Lobelia nuxa** F.Wimmer  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Apparently very localised and presumably rare.*

**Lobelia** sp. (incl. *L. euryoda* F.Wimmer var. *fissuratum* F.Wimmer)  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Known from only two collections.*

**Lobelia stricklandiae** Gilliland  
**Status:** VU D2  
 Distribution: Mpumalanga  
*This species occurs widely in countries to the north. A recent search of the area failed to reveal any plants of*

*this large conspicuous species. It is possible that its record was an error.*

**Lobelia trullifolia** subsp. *delicatula* (Compton) Thulin  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Mpumalanga

**Lobelia valida** L.Bolus  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Lobelia zwartkopensis** F.Wimmer  
**Status:** CR B1B2abc  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Eastern Cape  
*A search in late 2000 failed to reveal any plants.*

**Monopsis varifolia** Urb.  
**Status:** VU B1B2cd2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Very few recent collections have been made, much of its habitat is severely degraded or destroyed.*

**Wimmerella longitubus** (F.Wimmer) L.Serra, M.B.Crespo & Lammers  
*Laurentia longitubus* F.Wimmer  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*The most recent collection was in 1938.*

## ORCHIDACEAE

**Angraecum stella-africae** P.J.Cribb  
**Status:** VU D2  
 Distribution: Limpopo Province

**Bonatea lamprophylla** J.Stewart  
**Status:** VU B1B2cd2  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal

**Bonatea saundersiae** (Harv.) Dur. & Schinz  
**Status:** VU B1B2c  
 Endemism: Endemic  
 Threats: Habitat degradation, deforestation, agriculture  
 Distribution: KwaZulu-Natal, Limpopo Province

**Corycium microglossum** Lindl.  
**Status:** EN A1c  
 Endemism: Endemic  
 Distribution: Western Cape

**Diaphanthe millarii** (Bolus) H.P.Linder  
**Status:** EN B1B2abc  
 Endemism: Endemic  
 Threats: Alien plant infestation, collection  
 Distribution: Eastern Cape, KwaZulu-Natal  
*Heavily exploited by orchid collectors.*

**Didymoplexis verrucosa** Stewart & Hennessy  
**Status:** VU B1B2cd2  
 Endemism: Endemic  
 Threats: Habitat degradation  
 Distribution: KwaZulu-Natal

**Disa amoena** H.P.Linder  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Afforestation  
 Distribution: Mpumalanga

**Disa arida** Vlok  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Disa barbata** (L.f.) Sw.  
*Herschelianthe barbata* (L.f.) N.C.Anthony  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Alien plant infestation  
 Distribution: Western Cape

**Disa brevipetala** H.P.Linder  
**Status:** EX  
 Endemism: Endemic  
 Distribution: Western Cape  
*Only collected twice in 1942; possibly on abnormality.*

**Disa cedarbergensis** H.P.Linder  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*A single plant seen; possibly on abnormality.*

**Disa clavicornis** H.P.Linder  
**Status:** CR B1B2abc  
 Endemism: Endemic  
 Distribution: Mpumalanga  
*Known from two collections.*

**Disa cochlearis** Johnson & Liltved  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Disa draconis** (L.f.) Sw.  
**Status:** VU B1B2abcd  
 Endemism: Endemic  
 Threats: Urban expansion, agriculture  
 Distribution: Western Cape

**Disa ecalcarata** (Lewis) H.P.Linder  
*Manadenia ecalcarata* Lewis  
**Status:** EX  
 Endemism: Endemic  
 Distribution: Western Cape  
*Possibly on abnormality.*

**Disa forcipata** Schltr.  
*Herschelianthe forcipata* (Schltr.) Rauschert  
**Status:** EX  
 Endemism: Endemic  
 Distribution: ?, possibly Western Cape  
*Known from a single specimen described in 1897; possibly abnormality.*

**Disa hallackii** Rolfe  
**Status:** CR A1ceB1B2abcd  
 Endemism: Endemic  
 Threats: Urban expansion, agriculture, alien plant infestation  
 Distribution: Western Cape, Eastern Cape  
*Regarded as one of the most threatened South African orchids.*

**Disa introrsa** Kurzweil, Liltved & H.P.Linder  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Probably fire dependent (sporadic).*

**Disa lugens** Bolus var. *nigrescens* (H.P.Linder) H.P.Linder  
*Herschelianthe lugens* (Bolus) Rauschert var. *nigrescens* (H.P.Linder) N.C.Anthony  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Only seen once.*

**Disa macrostachya** (Lindl.) Bolus  
*Manadenia macrostachya* Lindl.  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Northern Cape  
*About five plants.*

*Disa maculomarronina* McMurtry

Status: VU D2

Endemism: Endemic

Threats: Afforestation, habitat degradation

Distribution: KwaZulu-Natal, Mpumalanga

*Probably of hybrid origin, the parents being D. hircicornis and D. versicolor. Increasing tourist activity impacts on the species in its habitat.*

*Disa neglecta* Sond.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Dependent on fire for recruitment.*

*Disa newdigatae* L.Bolus

*Herschelianthe newdigatae* (L.Bolus) N.C.Anthony

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*May be extinct.*

*Disa nubigena* H.P.Linder

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Possibly on abnormality.*

*Disa physodes* Sw.

*Manadenia physodes* (Sw.) Rchb.f.

Status: VU D2

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape

*Disa procera* H.P.Linder

*Herschelia excelsa* (Thunb.) Rolfe nom. illegit.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Disa sabulosa* Bolus

*Manadenia sabulosa* (Bolus) Kraenzl.

Status: EN B1B2abdc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Probably fire dependent.*

*Disa schlechteriana* Bolus

*Herschelianthe schlechteriana* (Bolus) N.C.Anthony

Status: VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Disa scullyi* Bolus

Status: CR A1B1B2

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

*Disa spathulata* (L.f.) Sw. subsp. *tripartita* (Lindl.) H.P.Linder

*Herschelianthe spathulata* (L.f.) Rauschert subsp. *tripartita*

(Lindl.) N.C.Anthony

Status: EN B1B2bc

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape-Eastern Cape boundary

*Disa subtenuicornis* H.P.Linder

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*Seen once. There were a few plants in the colony, therefore probably not just an abnormality. Apparently, another subpopulation was later found on a nearby peak.*

*Disa tenella* (L.f.) Sw. subsp. *tenella*

Status: VU A1c

Endemism: Endemic

Threats: Habitat degradation, alien plant infestation

Distribution: Western Cape

*Disperis purpurata* Rchb.f. subsp. *pallascens*

Bruyns

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

*Disperis virginialis* Schltr.

Status: VU D2

Endemism: Endemic

Threats: Afforestation

Distribution: Limpopo Province

*Pine plantations are a serious threat.*

*Eulophia coddii* A.V.Hall

Status: EN B1B2abdc

Endemism: Endemic

Threats: Afforestation

Distribution: Gauteng, Limpopo Province

*Eulophia leachii* Greatrex ex A.V.Hall

Status: VU A1c

Threats: Habitat degradation

Distribution: KwaZulu-Natal, Gauteng, Limpopo Province

*Habenaria mossii* (G.Will.) J.C.Manning

Status: EN C1C2a

Endemism: Endemic

Threats: Urban expansion

Distribution: Gauteng

*Possibly additional unconfirmed locality in the Eastern Cape.*

*Habenaria woodii* Schltr.

Status: EN B1B2abc

Endemism: Endemic

Distribution: KwaZulu-Natal

*Holothrix culveri* Bolus

Status: EX

Endemism: Endemic

Distribution: Mpumalanga

*Apparently only once collected in 1905. Possibly on abnormality.*

*Holothrix longicarnu* Lewis

Status: EX

Endemism: Endemic

Distribution: Eastern Cape

*Collected once in 1938. Probably not just an abnormality—there are a number of plants from the type locality.*

*Holothrix majubensis* C.Archer & R.Archer

Status: VU D2

Endemism: Endemic

Threats: Erosion

Distribution: KwaZulu-Natal

*Holothrix micrantha* Schltr.

Status: EN B1B2abdc

Endemism: Endemic?

Distribution: Gauteng

*Apparently, collected only once in 1949 in the vicinity of Inyonga (Zimbabwe). Area now under wattle plantation. High human impact. Type locality decimated. Possibly consider DD status.*

*Holothrix randii* Rendle

Status: VU B1B2abcd

Threats: Urban expansion

Distribution: Gauteng, Limpopo Province

*Microcoelia obovata* Summerh.

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

*Pterygodium connivens* Schelpe

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

*May be a subspecies or variety of Pterygodium cruciferum.*

*Pterygodium cruciferum* Sond.

Status: EN A1c

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Pterygodium newdigatae* Bolus var. *newdigatae*

Status: VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Known from a single collection.*

*Satyrium hallackii* Bolus subsp. *hallackii*

Status: EN B1B2bc

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation

Distribution: Western Cape, Eastern Cape

*Satyrium muticum* Lindl.

Status: EN B1B2abc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*A few plants were once found near Garden of Eden; plants in Attoquos Kloof (Oudtshoorn district) still exist.*

*Satyrium pulchrum* Johnson & Kurzweil

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Western Cape

*Known only from the type locality. Stock farming is a threat.*

*Satyrium rhodanthum* Schltr.

*Satyrium longicauda* Lindl. var. *longicauda* x *neglectum* Schltr.

subsp. *woodii* (Schltr.) A.V.Hall

Status: EN A1cB1B2abc

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: KwaZulu-Natal

*Threatened by housing developments. Most of the habitat has been transformed.*

*Schizodium longipetalum* Lindl.

Status: EN B1B2bc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Vanilla roscheri* Rchb.f.

Status: EN B1B2abc

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation, habitat degradation

Distribution: KwaZulu-Natal

*Zeuxine africana* Rchb.f.

Status: VU D2

Threats: Urban expansion

Distribution: KwaZulu-Natal

*Scott-Shaw lists this species as EN B1B2obcdc, but it is not declining now. Housing development is a threat.*

## ROSACEAE

*Cliffortia acocksii* Weim.

Status: EN B1B2c

Endemism: Endemic

Threats: Agriculture, urban expansion, road network

Distribution: Western Cape

*Only collected three times, last in 1949. May well be extinct as the area has been extensively farmed for many years. If it still exists, likely to be threatened by forms, housing and road expansion.*

*Cliffortia burgersii* E.G.H.Oliv. & Fellingham

Status: EN C2b

Endemism: Endemic



Threats: Grazing  
Distribution: Western Cape

***Cliffortia concinna* Weim.**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
Only found once in 1953, but in a relatively unexplored area. Species belongs to *C. glauca* complex; delimitation of species within this complex is uncertain.

***Cliffortia conifera* E.G.H.Oliv. & Fellingham**

**Status:** EN D1  
Endemism: Endemic  
Distribution: Western Cape  
Reported that frequent fires prevent recruitment, as no fruit were noted within five years from last fire.

***Cliffortia curvifolia* Weim.**

**Status:** CR B1B2abc  
Endemism: Endemic  
Threats: Agriculture, habitat degradation  
Distribution: Western Cape  
Only collected twice, one specimen without any further information and the other in 1895. Possibly extinct, but locality description is vague and extensive search of area has not yet been done. The species could easily have been overlooked by previous collectors.

***Cliffortia discolor* Weim.**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
Only collected once in 1884, but taxonomically very doubtfully distinct from *C. odorata*, a widespread species on Table Mountain.

***Cliffortia ericifolia* L.f.**

**Status:** EN B1B2c  
Endemism: Endemic  
Threats: Urban expansion, habitat degradation  
Distribution: Western Cape  
One certain subpopulation at Kenilworth Race Course, which has not been more fully assessed as yet. Two other subpopulations recorded since 1976 at Bothosig and Philadelphio have not yet been located. The Bothosig locality was probably destroyed by widening of N7 highway.

***Cliffortia geniculata* Weim.**

**Status:** VU D2  
Endemism: Endemic  
Threats: Alien plant infestation, fire  
Distribution: Western Cape  
Species belongs to *C. glauca* complex; delimitation of species within this complex is uncertain.

***Cliffortia hermaphrodita* Weim.**

**Status:** VU D2  
Endemism: Endemic  
Threats: Alien plant infestation, fire  
Distribution: Western Cape  
Only collected once in 1943; surprising that it has not been recollected as it occurs in a widely studied valley.

***Cliffortia hirta* Burm.f.**

**Status:** EN B1B2bc  
Endemism: Endemic  
Threats: Fire, habitat degradation  
Distribution: Western Cape  
Five locations known since 1940. Froggy Pond and University of Cape Town have been lost. Rondebosch Common has been assessed. The two subpopulations, if they still exist, at Milnerton and Bokboui, have not been seen as yet. Being a reseeded, it is particularly vulnerable to unnatural fire regimes.

***Cliffortia lanata* Weim.**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

***Cliffortia marginata* Eckl. & Zeyh.**

**Status:** EN B1B2abc

Endemism: Endemic  
Threats: Urban expansion, habitat degradation  
Distribution: Western Cape  
Current distribution has not yet been established, but likely to be very small and fragmented due to habitat in which it is found. Species belongs to *C. glauca* complex; delimitation of species within this complex is uncertain.

***Cliffortia monophylla* Weim.**

**Status:** VU B1B2bc  
Endemism: Endemic  
Threats: Agriculture, habitat degradation, alien plant infestation  
Distribution: Western Cape  
An easily overlooked species, but probably scarce due to habitat destruction.

***Cliffortia subdura* Weim.**

**Status:** CR B1B2bc  
Endemism: Endemic  
Threats: Alien plant infestation  
Distribution: Western Cape  
Requires active alien clearance to survive. Threatened in particular by *Acacia meurnsii* in riverbank habitat.

## RUTACEAE

***Acmadenia alternifolia* Cham.**

**Status:** VU B1B2bcd  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Western Cape  
Subpopulation above Stevens Bank in the Harkerville Forestry area has declined recently (2000) due to disturbance of the headland. Pine plantations confine the distribution to a narrow strip.

***Acmadenia argillophila* I.Williams**

**Status:** CR D1  
Endemism: Endemic  
Threats: Mining  
Distribution: Western Cape  
Subpopulation at Anysberg, but petals white—identification still needs confirmation. Seems to be different variety. Quarrying activities have resulted in near-extirpation.

***Acmadenia candida* I.Williams**

**Status:** EX  
Endemism: Endemic  
Distribution: Western Cape  
Only known subpopulation that remained was destroyed by forestry in 1968 (Nuweberg Forest Station).

***Acmadenia faucitincta* I.Williams**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
Collected only once. Area was searched in 1993, but probably not in the right locality; not found. Inaccessible habitat.

***Acmadenia gracilis* Dummer**

**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture, habitat degradation  
Distribution: Western Cape

***Acmadenia kiwanensis* I.Williams**

**Status:** CR B1B2c  
Endemism: Endemic  
Threats: Fire  
Distribution: Eastern Cape  
Rural agriculture (cattle)—grazing and trampling. Not a resprouter.

***Acmadenia latifolia* I.Williams**

**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape  
Rare and could quickly disappear if land use changes; subpopulations accessible.

***Acmadenia laxa* I.Williams**

**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

***Acmadenia macradenia* (Sond.) Dummer**

**Status:** VU D2  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Western Cape

***Acmadenia macropetala* (P.E.Glover) Compton**

**Status:** VU B1B2bcdD2  
Endemism: Endemic  
Threats: Agriculture, fire  
Distribution: Western Cape  
Slow sporadic decline, accessible habitats.

***Acmadenia nivea* I.Williams**

**Status:** VU D2  
Endemism: Endemic  
Threats: Fire  
Distribution: Western Cape  
Not a resprouter.

***Acmadenia nivenii* Sond.**

**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

***Acmadenia rupicola* I.Williams**

**Status:** VU D2  
Endemism: Endemic  
Threats: Fire, habitat degradation  
Distribution: Western Cape  
Accessible locality, but protected to a certain degree by growing amongst rocks; may have been more widely distributed in the past.

***Adenandra gracilis* Eckl. & Zeyh.**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
Safe (high altitude) but restricted. Only one specimen in PRE.

***Adenandra odoratissima* Strid subsp. *odoratissima***

**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

***Adenandra odoratissima* Strid subsp. *tenuis* Strid**

**Status:** VU D2  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

***Adenandra schlechteri* Dummer**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape

***Agathosma asperifolia* Eckl. & Zeyh.**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
Very restricted distribution.

***Agathosma canaliculata* P.A.Bean**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Western Cape  
Habitat specialist.

***Agathosma capitata* Sond.**

**Status:** EN B1B2c  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape  
Very restricted.

***Agathosma cephalades* E.Mey. ex Sond.****Status:** CR B1B2abc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Possibly already extinct? Reported to be affected by the raobios tea industry.****Agathosma citriadara* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Eastern Cape

*Habitat specialist.****Agathosma callina* Eckl. & Zeyh.****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

*Restricted to coastal dunes. Threatened by housing development.****Agathosma canferia* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathosma corymbosa* (Montin) G.Don****Status:** VU B1B2abcde

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape

*Possibly already endangered.****Agathosma decurrens* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Restricted to one mountain.****Agathosma dentata* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathosma digitata* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathosma distans* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Very restricted distribution.****Agathosma dregeana* Sond.****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Nat under threat from human impact.****Agathosma elata* Sond.****Status:** EN B1B2bc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Very restricted distribution.****Agathosma eriantha* (Steud.) Steud.****Status:** VU B1B2c

Endemism: Endemic

Threats: Agriculture, grazing/browsing

Distribution: Western Cape

*Limestone specialist. Affected by trampling.****Agathosma geniculata* Pillans****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

*Limestone in fixed coastal dunes.****Agathosma glabrata* Bartl. & Wendl.****Status:** VU B1B2bcd

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape

*Possibly already endangered.****Agathosma glandulosa* (Thunb.) Sond.****Status:** VU B1B2c

Endemism: Endemic

Threats: Agriculture, grazing

Distribution: Western Cape

*Susceptible to further human impact. Affected by trampling.****Agathosma gnidiiflora* Dummer****Status:** EX?

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Collected only once, agricultural oreo, probably extinct.****Agathosma hispida* (Thunb.) Bartl. & Wendl.****Status:** EN B1B2c

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Restricted distribution.****Agathosma invalucrata* Eckl. & Zeyh.****Status:** VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Habitat specialist.****Agathosma lancifolia* Eckl. & Zeyh.****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathosma maculata* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathosma marifolia* Eckl. & Zeyh.****Status:** VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Very restricted distribution.****Agathosma minuta* Schlttdl.****Status:** EN B1B2bc

Endemism: Endemic

Distribution: Western Cape

*Isolated subpopulations.****Agathosma muirii* E.Phillips****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

***Agathosma orbicularis* (Thunb.) Bartl. & H.L.Wendl.****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

***Agathosma pallens* Pillans****Status:** EN B1B2bc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Very restricted distribution.****Agathosma parvpetala* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Very restricted distribution.****Agathosma pattisoniae* Dummer****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Very restricted distribution.****Agathosma phillipsii* Dummer****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Isolated to one mountain.****Agathosma propinqua* Sond.****Status:** VU B1B2c

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Western Cape

*Isolated subpopulations.****Agathosma pulchella* (L.) Link****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

***Agathosma robusta* Eckl. & Zeyh.****Status:** EN B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

*Habitat specialist.****Agathosma ratundifolia* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathosma rubricaulis* Dummer****Status:** VU D2

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

***Agathosma salina* Eckl. & Zeyh.****Status:** EN B1B2c

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Habitat specialist; possibly endangered.****Agathosma sedifolia* Schlttdl.****Status:** EN B1B2c

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Limestone endemic.****Agathosma spinasa* Sond.****Status:** VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Accessible since it grows on lower slopes.****Agathosma stenapetala* (Steud.) Steud.****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Eastern Cape

*Susceptible to further human impact.****Agathosma subterretifolia* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Very restricted distribution.*



**Agathosma thymifolia** Schldt.  
**Status:** VU B1B2c  
 Endemism: Endemic  
 Threats: Agriculture, habitat degradation  
 Distribution: Western Cape  
*Habitot specialist.*

**Agathosma trichocarpa** Holmes  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Only found ance.*

**Agathosma umbonata** Pillans  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Habitot specialist.*

**Agathosma viviersii** P.A.Bean  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Habitat degradation  
 Distribution: Western Cape  
*Habitot specialist.*

**Agathosma williamsii** P.A.Bean  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Very restricted distribution.*

**Agathosma zwartbergense** Pillans  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Restricted to small port of Swortberg Mauntains.*

**Coleonema virgatum** (Schldt.) Eckl. & Zeyh.  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Diosma aristata** I.Williams  
**Status:** CR A1aceB1B2abceC2b  
 Endemism: Endemic  
 Threats: Alien plant infestation  
 Distribution: Western Cape  
*If it still exists, it will be extinct very soon.*

**Diosma fallax** I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Was listed as extinct but was collected in 1994.*

**Diosma haelkraalsensis** I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Diosma parvula** I.Williams  
**Status:** EN B1B2abcde  
 Endemism: Endemic  
 Threats: Alien plant infestation  
 Distribution: Western Cape  
*Driefantein locality overrun with wattles and is degraded.*

**Diosma passerinoides** Steud.  
**Status:** VU B1B2bcd  
 Endemism: Endemic  
 Threats: Agriculture  
 Distribution: Western Cape, Eastern Cape

**Diosma strumosa** I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Possibly more widespread.*

**Diosma thyrsophora** Eckl. & Zeyh.  
**Status:** VU D2  
 Endemism: Endemic

Distribution: Western Cape  
 Safe.

**Euchaetis avisylvana** I.Williams  
**Status:** VU A1aceD2  
 Endemism: Endemic  
 Threats: Road network, fire, afforestation  
 Distribution: Western Cape  
*Not o resprouter. Affected by pine plantations.*

**Euchaetis diosmoides** (Schltr.) I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Alien plant infestation, agriculture  
 Distribution: Western Cape

**Euchaetis intonsa** I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Euchaetis longicornis** I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Macrostylis barbiger** (L.f.) Bartl. & H.L.Wendl.  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Macrostylis cassiopoides** (Turcz.) I.Williams  
 subsp. *cassiopoides*  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Macrostylis cassiopoides** (Turcz.) I.Williams  
 subsp. *dregeana* (Sond.) I.Williams  
**Status:** EN B1B2abcd  
 Endemism: Endemic  
 Threats: Urban expansion, agriculture  
 Distribution: Western Cape  
*Extinct in large port of its range now.*

**Macrostylis hirta** E.Mey. ex Sond.  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Macrostylis ramulosa** I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape

**Macrostylis villosa** (Thunb.) Sond. subsp. *minor*  
 I.Williams  
**Status:** EX  
 Endemism: Endemic  
 Distribution: Western Cape  
*Type locality now under intensive cultivation, seorchs foiled to rediscover this plant.*

**Sheilanthera pubens** I.Williams  
**Status:** VU D2  
 Endemism: Endemic  
 Distribution: Western Cape  
*Safe, surrounded by agricultural practices, but prabably inoccissible.*

## SOLANACEAE

**Solanum litoraneum** A.E.Gonc.  
**Status:** VU B1B2c  
 Distribution: KwaZulu-Natal. Also known from Mozambique.

## THYMELAEACEAE

**Lachnaea aurea** Meisn.  
**Status:** VU B1B2c  
 Endemism: Endemic

Threats: Agriculture, alien plant infestation  
 Distribution: Western Cape

**Lachnaea axillaris** Meisn.  
**Status:** VU A1ce  
 Endemism: Endemic  
 Threats: Alien plant infestation, habitat degradation  
 Distribution: Western Cape

**Lachnaea capitata** (L.) Crantz  
**Status:** VU A1c  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Western Cape

**Lachnaea densiflora** Meisn.  
**Status:** VU A1c  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: Western Cape

**Lachnaea filicaulis** (Meisn.) Beyers  
**Status:** VU A1ce  
 Endemism: Endemic  
 Threats: Habitat degradation, alien plant infestation  
 Distribution: Western Cape

**Lachnaea grandiflora** (L.f.) Baill.  
**Status:** VU A1c  
 Endemism: Endemic  
 Threats: Urban expansion, alien plant infestation  
 Distribution: Western Cape

**Lachnaea greytonensis** Beyers ined.  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Fire  
 Distribution: Western Cape  
*Restricted, localised distribution. Being o reseeder, it is vulnerable to frequent mountain fires.*

**Lachnaea leipoldtii** Beyers ined.  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Fire  
 Distribution: Western Cape  
*Restricted distribution. Being o reseeder, it is vulnerable to frequent mountain fires.*

**Lachnaea oliverorum** Beyers ined.  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Fire  
 Distribution: Western Cape  
*A localised species with o restricted distribution. Being o reseeder, it is vulnerable to frequent mountain fires.*

**Lachnaea stokoei** Beyers ined.  
**Status:** EX  
 Endemism: Endemic  
 Distribution: Western Cape  
*This species is known from only two collections. More than 40 years have elapsed since the last collection. This portion of the Langeberg has been fairly well surveyed and specific seorchs for this species have been unsuccessful (1993).*

**Lachnaea uniflora** (L.) Crantz  
**Status:** VU A1c  
 Endemism: Endemic  
 Threats: Urban expansion, habitat degradation  
 Distribution: Western Cape  
*Most of the subpopulations on sandy flats north of Cape Peninsula and on the Cape Peninsula in vicinity of Wynberg and Constantia have disappeared.*

**Passerina burchellii** Thoday  
**Status:** VU D2  
 Endemism: Endemic  
 Threats: Fire  
 Distribution: Western Cape  
*Mountain tops, misty southwest facing rocky outcrops.*

*Passerina paludosa* Thoday

Status: VU B1B2abcd

Endemism: Endemic

Threats: Urban expansion, alien plant infestation

Distribution: Western Cape

Recorded from the Cope Flots, Simonstown and elsewhere. Large subpopulation between Rondevlei Nature Reserve and Zeekoeivlei. Other subpopulations have been propagated from cuttings.

*Struthiola anomala* Hilliard

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal



*Astridia citrina*, a rare endemic from KwaZulu-Natal and Eastern Cape (Hilton-Taylor, 1996a). (Photo: NBI)



*Aloe pillansii*, a conservation flagship, is found in the Northern Cape and extends into Namibia. (Photo: NBI)



*Encephalartos brevifoliolatus* is a highly threatened cycad that is endemic to South Africa. (Photo: NBI)



# LOWER RISK

## AIZOACEAE

### *Conophytum armianum* S.A.Hammer

Status: LR-nt

Endemism: Endemic

Threats: Mining, grazing

Distribution: Northern Cape

Northern subpopulations fragmented and small, consisting mainly of seedlings or badly stunted plants; southern plants (morphologically different) large healthy subpopulations. Possibly collected in the past.

### *Conophytum auriflorum* Tischer subsp. *auriflorum*

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Karingshuis plants are smaller, darker red-skinned, much more reluctant to flower in cultivation, but same ecology.

### *Conophytum bicarinatum* L.Bolus

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

The two disjunct subpopulations are morphologically different.

### *Conophytum blandum* L.Bolus

Status: LR-nt

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Mining and habitat degradation may pose future threats.

### *Conophytum carpianum* L.Bolus

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Thriving at present.

### *Conophytum concavum* L.Bolus

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

Common within the distribution area.

### *Conophytum ernstii* S.A.Hammer subsp. *ernstii*

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

### *Conophytum frutescens* Schwantes

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

One subpopulation lacks two of *C. frutescens*'s prime traits: red petals and spring flowering.

### *Conophytum khamiesbergense* (L.Bolus)

Schwantes

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

### *Conophytum lithopsoides* L.Bolus subsp.

*lithopsoides*

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

### *Conophytum loeschianum* Tischer

Status: LR-lc

Distribution: Northern Cape

### *Conophytum praesectum* N.E.Br.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

### *Conophytum regale* Lavis

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Easy to grow and well-established in horticulture.

### *Conophytum rugosum* S.A.Hammer subsp. *rugosum*

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Northern Cape

### *Conophytum swanepoelianum* Rawe subsp.

*swanepoelianum*

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

### *Conophytum velutinum* Schwantes subsp.

*velutinum*

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

### *Conophytum verrucosum* (Lavis) G.D.Rowley

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

One subpopulation is placed under this species but shouldn't be—it is possibly *C. friedrichiae*.

## ALOACEAE

### *Aloe affinis* A.Berger

Status: LR-lc

Endemism: Endemic

Threats: Afforestation

Distribution: Mpumalanga

Quite widely distributed but under threat from commercial forestry.

### *Aloe arenicola* Reynolds

Status: LR-lc

Endemism: Endemic

Threats: Mining, grazing, collection

Distribution: Western Cape, Northern Cape

Widespread along dunes of the West Coast. Threatened by mining and grazing. Known to be illegally collected.

### *Aloe falcata* Baker

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape, Northern Cape

### *Aloe haemanthifolia* Marl. & A.Berger

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

### *Aloe krapohlana* Marloth

Status: LR-nt

Endemism: Endemic

Threats: Collection, agriculture, grazing

Distribution: Northern Cape, Western Cape

Known to be illegally collected.

### *Aloe vryheidensis* Groenewald

Status: LR-lc

Endemism: Endemic

Distribution: Mpumalanga, Limpopo Province, North-West, KwaZulu-Natal

Was threatened until placed into synonymy with *A. dolomitica*.

## AMARYLLIDACEAE

### *Apodolirion lanceolatum* Baker

Status: LR-nt

Endemism: Endemic

Threats: Browsing

Distribution: Western Cape

Flowers are eaten by wild animals.

### *Brunsvigia pulchra* (W.F.Barker) D. & U.Mull.-

Doblies

Status: LR-lc

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Northern Cape

Trampling by goats is a threat.

### *Brunsvigia striata* (Jacq.) Aiton

*Brunsvigia minor* Lindl.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape, Eastern Cape

### *Brunsvigia undulata* Leight.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

### *Clivia caulescens* R.A.Dyer

Status: LR-lc

Distribution: Eastern Cape

### *Clivia gardenii* Hook.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

### *Clivia miniata* (Lindl.) Regel

Status: LR-lc

Distribution: Eastern Cape, KwaZulu-Natal

### *Clivia nobilis* Lindl.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

### *Crinum acaule* Baker

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

### *Crinum campanulatum* Herb.

Status: LR-lc

Endemism: Endemic

Threats: Salinisation?

Distribution: Eastern Cape

Change in water quality through pollution is a threat.

### *Crinum variable* (Jacq.) Herb.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

No longer considered to be a rare species.

### *Cyrtanthus bicolor* R.A.Dyer

Status: LR-lc

Distribution: Mpumalanga

### *Cyrtanthus brachyscyphus* Baker

*Cyrtanthus rectiflorus* Baker

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

*C. rectiflorus* Bak. is known only from the type specimen at K ("Perie"). Considered to be a synonym of *C. brachyscyphus* Baker, a widespread species.

***Cyrtanthus collinus* Ker Gawl.***Cyrtanthus stoddensis* Schonland**Status: LR-lc**

Endemism: Endemic

Distribution: Eastern Cape

*Considered to be a local form of the widespread C. collinus* Ker Gawl.***Cyrtanthus helictus* Lehm.****Status: LR-lc**

Endemism: Endemic

Threats: Grazing

Distribution: Eastern Cape

***Cyrtanthus herrei* (Leight.) R.A.Dyer****Status: LR-nt**

Threats: Collection

Distribution: Northern Cape

*Known to be illegally collected.****Cyrtanthus leucanthus* Schltr.****Status: LR-lc**

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Western Cape

*Depends on fire to flower. Coastal development is a threat.****Cyrtanthus loddigesianus* (Herb.) R.A.Dyer****Status: LR-lc**

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Eastern Cape

*Grows between coastal houses if not mown. Coastal development is a threat.****Cyrtanthus smithiae* Watt. ex Harv.****Status: LR-nt**

Endemism: Endemic

Threats: Collection, grazing

Distribution: Eastern Cape

*Known to be illegally collected.****Cyrtanthus epiphyticus* J.M.Wood****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal, former Transvaal

***Gethyllis ciliaris* (Thunb.) Thunb. subsp. *ciliaris*****Status: LR-lc**

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Western Cape

*Herbarium records incomplete. Coastal development is a threat.****Gethyllis multifolia* L.Bolus***Gethyllis campanulata* L.Bolus**Status: LR-lc**

Endemism: Endemic

Threats: Collection, grazing

Distribution: Northern Cape, Western Cape

*G. campanulata* regarded as the northern form of this species. *Known to be illegally collected. Sheep forming activity is a threat.****Haemanthus amarylloides* Jacq. subsp.*****amarylloides*****Status: LR-nt**

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation

Distribution: Northern Cape, Western Cape

*Housing development is a threat.****Haemanthus dasyphyllus* Snijman****Status: LR-lc**

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

*Known to be illegally collected.****Haemanthus lanceifolius* Jacq.****Status: LR-nt**

Endemism: Endemic

Threats: Collection, grazing/browsing

Distribution: Western Cape

*Known to be illegally collected. Trampling activity is a threat.****Haemanthus paucifolius* Snijman & A.E.van Wyk****Status: LR-lc**

Threats: Grazing/browsing

Distribution: Mpumalanga

*Infrequent trampling activity is a threat.****Haemanthus pubescens* L.f. subsp. *arenicola*****Snijman****Status: LR-lc**

Threats: Mining

Distribution: Northern Cape

***Haemanthus tristis* Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Hessea incana* Snijman****Status: LR-nt**

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Northern Cape

*Grazing/browsing by domesticated animals is a threat.****Hessea pilosa* D. & U.Mull.-Doblies****Status: LR-lc**

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Northern Cape

*Trompling by domestic stock is a threat.****Hessea pulcherrima* D. & U.Mull.-Doblies****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Hessea stenosphon* (Snijman) D. & U.Mull.-Doblies****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Nerine bowdenii* Watson****Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

***Nerine humilis* (Jacq.) Herb.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

***Nerine pancratioides* Baker***Nerine platypetala* McNeil**Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal, Mpumalanga, Eastern Cape

***Nerine pudica* Hook.F.****Status: LR-nt**

Endemism: Endemic

Distribution: Western Cape

***Strumaria barbarae* Oberm.****Status: LR-lc**

Threats: Grazing/browsing

Distribution: Northern Cape

*Goots are a problem.****Strumaria bidentata* Schinz****Status: LR-nt**

Threats: Agriculture, grazing/browsing, mining

Distribution: Northern Cape

*Goots are a problem.****Strumaria discifera* Marloth ex Snijman subsp.*****bulbifera* Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria karooica* (W.F.Barker) Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria karooopoortensis* (D. & U.Mull.-Doblies)****Snijman****Status: LR-nt**

Endemism: Endemic

Distribution: Western Cape

***Strumaria massoniella* (D. & U.Mull.-Doblies)****Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria merxmulleriana* (D. & U.Mull.-Doblies)****Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria picta* W.F.Barker****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria pubescens* W.F.Barker****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria pygmaea* Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape, Western Cape

***Strumaria salteri* W.F.Barker****Status: LR-lc**

Endemism: Endemic

Threats: Collection, agriculture

Distribution: Western Cape

*This species has extremely attractive flowers. Known to be illegally collected by bulb enthusiasts.****Strumaria spiralis* (L'Herit.) Aiton***Carpolyza spiralis* (L'Herit.) Salisb.**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Strumaria villosa* Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria watermeyeri* L.Bolus subsp.*****botterkloofensis* (D. & U.Mull.-Doblies) Snijman****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

***Strumaria watermeyeri* L.Bolus subsp.*****watermeyeri*****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

## APOCYNACEAE

***Brachystelma australe* R.A.Dyer****Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

*Very similar to B. modestum.*



***Brachystelma cathcartense* R.A.Dyer**

**Status: LR-nt**  
Endemism: Endemic  
Distribution: Eastern Cape  
*Sheep farming (extensive).*

***Brachystelma delicatum* R.A.Dyer**

**Status: LR-nt**  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Eastern Cape  
*Grows with B. campanulatum. Cultivation of pineapples and other crops threatens this species. However, found in rocky areas where it is safe.*

***Brachystelma dimorphum* R.A.Dyer subsp. *dimorphum***

**Status: LR-1c**  
Endemism: Endemic  
Distribution: North-West

***Brachystelma gemmeum* R.A.Dyer**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Mpumalanga, Limpopo Province

***Brachystelma glenense* R.A.Dyer**

**Status: LR-nt**  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Free State, North-West  
*Nutrient-rich clay soils ideal for wheat crops. Farming of wheat is a threat.*

***Brachystelma incanum* R.A.Dyer**

**Status: LR-1c**  
Endemism: Endemic  
Threats: Collection  
Distribution: North-West

***Brachystelma inconspicuum* S.Venter**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Limpopo Province

***Brachystelma longifolium* (Schltr.) N.E.Br.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Mpumalanga  
*Rare but not threatened.*

***Brachystelma minimum* R.A.Dyer**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Eastern Cape  
*Non-arable habitat ensures safety from farming activities.*

***Brachystelma minor* E.A.Bruce**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Limpopo Province  
*Non-arable habitat ensures safety from farming activities.*

***Brachystelma parvulum* R.A.Dyer**

**Status: LR-nt**  
Endemism: Endemic  
Distribution: Mpumalanga

***Brachystelma parvulum* R.A.Dyer**

**Status: LR-1c**  
Distribution: KwaZulu-Natal, Free State

***Brachystelma petraeum* R.A.Dyer**

**Status: LR-nt**  
Endemism: Endemic  
Threats: Afforestation  
Distribution: KwaZulu-Natal

***Brachystelma pilosum* R.A.Dyer**

*Brachystelma hirtellum* Weim.  
**Status: LR-nt**  
Endemism: Endemic

Threats: Agriculture  
Distribution: Limpopo Province  
*Nat threatened due to past decline. Habitat transformed through tobacco and peanut farming.*

***Brachystelma tenellum* R.A.Dyer**

**Status: LR-nt**  
Endemism: Endemic  
Distribution: KwaZulu-Natal  
*Nat threatened due to small area.*

***Ceropegia cancellata* Rchb.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Eastern Cape

***Ceropegia fimbriata* E.Mey. subsp. *fimbriata***

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Eastern Cape  
*Very closely related to C. cannivens–C. geniculata–C. zeyheri group.*

***Ceropegia mafekingensis* (N.E.Br.) R.A.Dyer**

**Status: LR-1c**  
Distribution: Gauteng, North-West  
*Widespread, but rare in locality. More like Brachystelma than Ceropegia.*

***Ceropegia radicans* Schltr. subsp. *radicans***

**(M.R.Henderson) R.A.Dyer**  
**Status: LR-nt**  
Endemism: Endemic  
Distribution: Eastern Cape

***Ceropegia scabriflora* N.E.Br.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: KwaZulu-Natal  
*Rare, but not threatened.*

***Ceropegia stentiae* E.A.Bruce**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: North-West, Limpopo Province

***Ceropegia turricula* E.A.Bruce**

**Status: LR-nt**  
Endemism: Endemic  
Distribution: Limpopo Province, Mpumalanga, Gauteng

## ASTERACEAE

***Adenoglossa decurrens* (Hutch.) B.Nord.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Northern Cape  
*Annual herb that seems to grow only in favourable years.*

***Anaxeton brevipes* Lundgren**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape  
*Grows on rocky slopes.*

***Anaxeton ellipticum* Lundgren**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape  
*Usually grows on rocky slopes.*

***Anaxeton hirsutum* (Thunb.) Less.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape  
*Grows on mountain slopes.*

***Anaxeton virgatum* DC.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape  
*Rare; usually grows on southern slopes.*

***Antithrix flavicoma* DC.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Northern Cape

***Arctotis bolusii* (S.Moore) Lewin**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Free State?, Northern Cape

***Arctotis sulcocarpa* Lewin**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape  
*Arctotis needs revision urgently.*

***Athanasia crithmifolia* (L.) L. subsp. *palmatifida***

**(DC.) Källersjö**  
**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape  
*Generally in wet areas at altitudes above 600 m on mountain sides.*

***Athanasia grandiceps* Hilliard & B.L.Burtt**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: KwaZulu-Natal  
*Grows in rough grass and shrub communities.*

***Athanasia hirsuta* Thunb.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape

***Athanasia oocephala* (DC.) Källersjö**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape  
*Grows on dry, grassy, lower slopes.*

***Athanasia scabra* Thunb.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape

***Eriocephalus tenuipes* C.A.Sm.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Eastern Cape

***Euryops brevifolius* Compton**

**Status: LR-1c**  
Endemism: Endemic  
Threats: Fire  
Distribution: Western Cape

***Euryops marlothii* B.Nord.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Northern Cape  
*Local but dominant in patches in karraid low scrub.*

***Euryops polytrichoides* (Harv.) B.Nord.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Eastern Cape  
*Restricted distribution.*

***Felicia canaliculata* Grau**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape

***Helichrysum amplexens* Hilliard**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: KwaZulu-Natal

***Helichrysum cochleariforme* DC.**

**Status: LR-1c**  
Endemism: Endemic  
Distribution: Western Cape

*Helichrysum ephelos* Hilliard**Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

*Forms large mats on damp earth banks and tussocks of the marshy sources of streams.**Helichrysum incarnatum* DC.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Inconspicuous plant. Undercollected, but common.**Helichrysum isolepis* Bolus**Status:** LR-nt

Endemism: Endemic

Distribution: Eastern Cape

*Helichrysum jubilatatum* Hilliard**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

*Helichrysum longinquum* Hilliard**Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

*Helichrysum mariescopicum* Hilliard**Status:** LR-lc

Endemism: Endemic

Distribution: Mpumalanga

*Helichrysum micropoides* DC.**Status:** LR-lc

Distribution: Northern Cape, Western Cape

*Helichrysum milleri* Hilliard**Status:** LR-lc

Distribution: Mpumalanga

*Helichrysum palustre* Hilliard**Status:** LR-lc

Distribution: KwaZulu-Natal, Eastern Cape

*Helichrysum pulchellum* DC.**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Helichrysum rutilans* (L.) D.Don.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape, Northern Cape, Free State

*Helichrysum saxicola* Hilliard**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Helichrysum sessile* DC.**Status:** LR-lc

Endemism: Endemic

*Helichrysum simulans* Harv. & Sond.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Inconspicuous plant. Undercollected, but common.**Helichrysum tricoatum* (Thunb.) Less.**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Helichrysum woodii* N.E.Br.**Status:** LR-nt

Endemism: Endemic

Threats: Alien plant infestation, habitat degradation  
Distribution: KwaZulu-Natal*Inula paniculata* (Klatt) Burt Davy**Status:** LR-lc

Endemism: Endemic

Distribution: Limpopo Province, Mpumalanga

*Lasiopogon ponticulus* Hilliard**Status:** LR-lc

Distribution: Northern Cape

*Grows in sand.**Macowanina corymbosa* M.D.Henderson**Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

*Osteospermum armatum* Norl.**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

*Osteospermum attenuatum* Hilliard & B.L.Burt**Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

*Othonna abrotanifolia* (Harv.) Druce*Daria abrotanifolia* Harv.**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

*Othonna armiana* van Jaarsv.**Status:** LR-nt

Endemism: Endemic

Distribution: Northern Cape

*Othonna burtii* B.Nord.**Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

*Othonna petiolaris* DC.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Othonna retrorsa* DC. var. *spektakelensis* (Compt.)

Rowley

**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

*Pentatrichia alata* S.Moore**Status:** LR-lc

Endemism: Endemic

Distribution: Limpopo Province, Mpumalanga

*Phymaspermum schroteri* Compton**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Pteronia tenuifolia* DC.**Status:** LR-nt

Endemism: Endemic

Distribution: Western Cape

*Senecio albopunctatus* Bolus**Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

*Senecio anthemifolius* Harv.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Senecio austromontanus* Hilliard**Status:** LR-lc

Distribution: KwaZulu-Natal, Eastern Cape

*Senecio coleophyllus* Turcz.**Status:** LR-lc

Distribution: Western Cape

*Senecio foeniculoides* Harv.**Status:** LR-nt

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Senecio haworthii* (Sweet) Sch.Bip.**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape, Eastern Cape

*Senecio medley-woodii* Hutch.**Status:** LR-lc

Distribution: Mpumalanga, KwaZulu-Natal, Eastern Cape

*Senecio muirii* L.Bolus**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Senecio paniculatus* P.J.Bergius*Senecia diadon* DC.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Synonym was listed by Hilton-Taylor.**Senecio puberulus* DC.**Status:** LR-lc

Endemism: Endemic

Distribution: Eastern Cape

*Senecio pubigerus* L.*Senecio onopetes* C.Jeffrey**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Synonym was listed by Hilton-Taylor.**Senecio rehmannii* Bolus**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Senecio saniensis* Hilliard & B.L.Burt**Status:** LR-lc

Distribution: KwaZulu-Natal

*Senecio sarcoides* (DC.) C.Jeffrey**Status:** LR-lc

Distribution: Western Cape, Northern Cape

*Senecio corymbiferus* has been taken into synonymy with this taxon, therefore common.*Thaminophyllum latifolium* Bond**Status:** LR-nt

Endemism: Endemic

Distribution: Western Cape

*Thaminophyllum mundii* Harv.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Thaminophyllum multiflorum* Harv.**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

*Trichogyne lerouxiae* Beyers**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

*Troglophyton acocksianum* Hilliard**Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape



**Ursinia coronopifolia** (Less.) N.E.Br.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Ursinia pygmaea** DC.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Northern Cape, Western Cape

**Ursinia subflosculosus** (DC.) Prassler  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Vellereophyton gracillimum** Hilliard  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: Western Cape

## CAMPANULACEAE

**Prismatocarpus cordifolius** Adamson  
**Status:** LR-lc  
 Endemism: Endemic -  
 Distribution: Western Cape

**Prismatocarpus decurrens** Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Prismatocarpus hispidus** Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Prismatocarpus impicitotus** Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Prismatocarpus lycioides** Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Prismatocarpus pouciflorus** Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Prismatocarpus pilosus** Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Prismatocarpus spinosus** Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Rhigiophyllum squarrosus** Hochst.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Roello bryoides** H.Buek  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Northern Cape, Western Cape

**Roello compocto** Schltr.  
*Roello cuspidata* Adamson var. *hispidus* Adamson  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape  
 Synonym was listed by Hilton-Taylor.

**Roello incurva** A.DC.  
*Raella rhodantha* Adamson  
**Status:** LR-lc  
 Endemism: Endemic

Distribution: Western Cape  
 Synonym was listed by Hilton-Taylor.

**Roello prostrata** E.Mey. ex DC.  
*Raella incurva* A.DC. var. *rigida* Adamsan  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape  
 Synonym was listed by Hilton-Taylor.

**Roello spicato** L.f.  
*Raella lightfootioides* Schltr.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape  
 Synonym was listed by Hilton-Taylor.

**Wohlenbergia odomsonii** Lammers  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Wohlenbergia ondrosacea** A.DC.  
**Status:** LR-lc  
 Endemism: Endemic

**Wohlenbergia brachycorpo** Schltr.  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: Western Cape

**Wohlenbergia brachyphylo** (Adamson) Lammers  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Wohlenbergia cernuo** (Thunb.) A.DC.  
*Wahlenbergia ciliolata* A.DC.; *Wahlenbergia clavatulula* Brehmer  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape  
 Synonyms were listed by Hilton-Taylor.

**Wohlenbergia constricta** Brehmer  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Wahlenbergia cuspidata** Brehmer  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape, Eastern Cape, KwaZulu-Natal

**Wohlenbergia ecklonii** H.Buek  
*Wahlenbergia swellendamensis* H.Buek  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape  
 Synonym was listed by Hilton-Taylor.

**Wahlenbergia kowiensis** R.A.Dyer  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Eastern Cape

**Wohlenbergia levynsiae** Lammers  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: Western Cape

**Wohlenbergia minuto** Brehmer  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Northern Cape

**Wohlenbergia nomoquono** Sond.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Northern Cape

**Wohlenbergia oligonotho** Lammers  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Wohlenbergia pinnato** Compton  
**Status:** LR-nt  
 Distribution: KwaZulu-Natal

**Wohlenbergia polyantha** Lammers  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Wohlenbergia riversdalensis** Lammers  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

## CONVOLVULACEAE

**Cuscuta kilimonjari** Oliv. var. *kilimanjori*  
**Status:** LR-lc  
 Distribution: Limpopo Province  
 Parasite, mainly on Lamiaceae.

**Ipomoea stenosphon** Hallier f.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Limpopo Province

**Paralepistemon shirensis** (Oliv.) Lejoly & Lisowski  
**Status:** LR-lc  
 Distribution: Limpopo Province

**Stictocardia loxiflora** (Baker) Hallier f. var. *woodii* (N.E.Br.) Verdc.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal

## CUCURBITACEAE

**Merremia dissecta** (Jacq.) Hallier f.  
**Status:** LR-lc

**Oreosyce africano** Hook.f.  
**Status:** LR-lc  
 Distribution: Limpopo Province

## CYPERACEAE

**Carpha schlechteri** C.B.Clarke  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape  
 Known from type (Skurweberg) and one other locality.  
 Occurs in moist rocky habitats.

**Costulario notolensis** C.B.Clarke  
**Status:** LR-lc  
 Distribution: KwaZulu-Natal, Limpopo Province, Mpumalanga

**Cyperus notolensis** Hochst.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Eastern Cape, KwaZulu-Natal

**Ficinia gydomontono** T.H.Arnold  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

**Ficinia pygmaea** Boeck.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Western Cape

*Ficinia quinquangularis* Boeck.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

*Schoenoxiphium ecklonii* Nees

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

*Schoenoxiphium lehmannii* (Nees) Steud.

Status: LR-lc

Distribution: Free State, KwaZulu-Natal, Western Cape, Eastern Cape, Mpumalanga, North-West, Limpopo Province

*Scirpus varius* Boeck. ex C.B.Clarke

Status: LR-lc

Distribution: Limpopo Province, North-West, Gauteng, Mpumalanga, KwaZulu-Natal

*Extinct in KwaZulu-Natal due to roadbuilding.*

*Tetraria brachyphylla* Levyns

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

*Occurs in sandy soil.*

*Tetraria compacta* Levyns

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

*Requires taxonomic evolution: related to common and widespread T. cuspidata (Rottb.) C.B.Clarke.*

*Tetraria robusta* (Kunth) C.B.Clarke

*Tetraria compressa* Turill

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Western Cape, Eastern Cape

*Trianoptiles stipitata* Levyns

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape, Western Cape

## HYPOXIDACEAE

*Empodium namaquensis* (Baker) M.F.Thomps.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Rhodohypoxis incompta* Hilliard & B.L.Burtt

Status: LR-nt

Endemism: Endemic

Distribution: KwaZulu-Natal

*Restricted to subalpine grasslands at altitude of 2,500 m.*

*Rhodohypoxis thodiana* (Nel) Hilliard & B.L.Burtt

*Rhodohypoxis rubella* (Baker) Nel var. *thodiana* Nel

Status: LR-nt

Endemism: Endemic

Distribution: KwaZulu-Natal

*Restricted to subalpine grasslands at altitude of 2,500 m.*

*Saniella occidentalis* (Nel) B.L.Burtt

*Empodium occidentale* (Nel) B.L. Burtt

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Spiloxene curculigoides* (Bolos) Garside

*Spilaxene declinata* (Nel) Garside

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

*Spiloxene serrata* (Thunb.) Garside

*Spilaxene linearis* (Andrews) Garside

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

*Spiloxene* sp. G.Will. 4482 at NBG; Giess 13055 at

PRE & WIND

Status: LR-lc

Distribution: Northern Cape

## LOBELIACEAE

*Cyphia oligotricha* Schltr.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

*Lobelia erinus* L.

Status: LR-lc

Endemism: Endemic

Distribution: Countrywide

*Lobelia muscoides* Cham.

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

*Localised, but abundant.*

*Lobelia pinifolia* L. var. *pinifolia*

Status: LR-lc

Endemism: Endemic

Distribution: Cape

*Monopsis flava* (Eckl. & Zeyh.) F.Wimmer

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

*Monopsis kowynensis* F.Wimmer

Status: LR-lc

Endemism: Endemic

Distribution: Mpumalanga

*Monopsis unidentata* (Dryand.) E.Wimm. subsp.

*unidentata*

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

*Wimmerella mariae* (F.Wimmer) L.Serra,

M.B.Crespo & Lammers

*Laurentia mariae* F.Wimmer

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

*The locality is very remote and poorly collected, but the subpopulations are probably relatively secure.*

## ORCHIDACEAE

*Acrolophia barbata* (Thunb.) H.P.Linder

*Aralaphia lunata* (Schltr.) Schltr. & Bolus

Status: LR-lc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape, Eastern Cape

*Mantane and coastal flats.*

*Acrolophia bolusii* Rolfe

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

*Partly sporadic (fire).*

*Acrolophia capensis* (Berg.) Fourc.

*Aralaphia capensis* (Berg.) Fourc. var. *capensis*

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

*Acrolophia micrantha* (Lindl.) Schltr. & Bolus

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

*Acrolophia ustulata* (Bolos) Schltr. & Bolus

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

*Sporadic (fire), minute plants and probably often overlooked.*

*Angraecum chamaeanthus* Schltr.

Status: LR-nt

Distribution: Mpumalanga, Limpopo Province

*Ansellia africana* Lindl.

Status: LR-nt

Threats: Collection

Distribution: KwaZulu-Natal, Mpumalanga, Limpopo Province

*Used for horticultural and medicinal purposes.*

*Bolusiella maudiae* (Bolos) Schltr.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

*Bonatea speciosa* (L.f.) Willd. var. *speciosa*

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal, Gauteng, North-West, Limpopo Province, Mpumalanga, Western Cape

*Brachycorythis macowaniana* Rchb.f.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

*Flowers after fire.*

*Brownleea recurvata* Sond.

Status: LR-lc

Distribution: Western Cape, Eastern Cape, KwaZulu-Natal, Mpumalanga

*Calanthe sylvatica* (Thou.) Lindl.

Status: LR-lc

Distribution: Western Cape, Eastern Cape, KwaZulu-Natal, Mpumalanga, Limpopo Province

*Geratandra venosa* (Lindl.) Schltr.

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Cheirostylis gymnochiloides* (Ridl.) Rchb.f.

Status: LR-nt

Distribution: KwaZulu-Natal

*Corycium deflexum* (Bolos) Rolfe

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape, Northern Cape

*Corycium excisum* Lindl.

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Corycium flanaganii* (Bolos) Kurzweil &

H.P.Linder

Status: LR-lc

Distribution: Eastern Cape, KwaZulu-Natal

*Corycium ingeanum* Oliver

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape



***Corycium orobanchoides* (L.f.) Sw.***Corycium vestitum* Sweet**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Corycium tricuspidatum* Bolus****Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal

***Corymborkis corymbis* Thou.****Status: LR-nt**

Distribution: Eastern Cape, KwaZulu-Natal

***Cynorkis compacta* (Rchb.f.) Rolfe****Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal

***Disa aurata* (Bolus) Parker & Koopowitz***Disa tripetaloides* (L.f.) N.E.Br. subsp. *aurata* (Bolus) H.P.Linder**Status: LR-lc**

Endemism: Endemic

Threats: Collection

Distribution: Western Cape

*Affected by baboon activity.****Disa basutorum* Schltr.****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

***Disa begleyi* L.Bolus****Status: LR-nt**

Endemism: Endemic

Distribution: Western Cape

***Disa bodkinii* Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Sporadic (fire).****Disa brachyceras* Lindl.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa caffra* Bolus****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

***Disa cardinalis* H.P.Linder****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Localised.****Disa cephalotes* Rchb.f. subsp. *frigida* (Schltr.)****H.P.Linder****Status: LR-lc**

Distribution: KwaZulu-Natal

***Disa cernua* (Thunb.) Sw.***Manadenia cernua* (Thunb.) Dur. & Schinz**Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation, alien plant infestation

Distribution: Western Cape, Eastern Cape

***Disa extinctoria* Rchb.f.****Status: LR-lc**

Distribution: Mpumalanga, Limpopo Province

***Disa forficaria* Bolus***Herschelianthe forficaria* (Bolus) N.C.Anthony**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*May be extinct.****Disa longifolia* Lindl.****Status: LR-nt**

Endemism: Endemic

Threats: Damming

Distribution: Western Cape

*Morsh environment. Large populations.****Disa lugens* Bolus var. *lugens****Herschelianthe lugens*-(Bolus) Rauschert var. *lugens***Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape, Eastern Cape

*Declined in the past (Cape Flots) but more than three generations ago.****Disa marlothii* Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

***Disa micropetala* Schltr.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

***Disa minor* (Sond.) Rchb.f.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa montana* Sond.****Status: LR-lc**

Endemism: Endemic

Distribution: Eastern Cape

***Disa multifida* Lindl.***Herschelianthe multifida* (Lindl.) Rauschert**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa nervosa* Lindl.****Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga

***Disa obtusa* Lindl. subsp. *obtusa*****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa ocellata* Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa oreophila* Bolus subsp. *erecta* H.P.Linder****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

***Disa ovalifolia* Sond.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa pillansii* L.Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa pulchra* Sond.****Status: LR-lc**

Endemism: Endemic

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal, Free State

***Disa pygmaea* Bolus***Monadenia pygmaea* (Bolus) T.Durand & Schinz**Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Probably fire dependent.****Disa rhodantha* Schltr.****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga, Limpopo Province

***Disa salteri* Lewis****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa sankeyi* Rolfe****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

***Disa spathulata* (L.f.) Sw. subsp. *spathulata****Herschelianthe spathulata* (L.f.) Rauschert subsp. *spathulata***Status: LR-lc**

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape, Northern Cape

***Disa stachyoides* Rchb.f.****Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal, Free State,

Mpumalanga, Limpopo Province

*Very common.****Disa tenuicornis* Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa tenuis* Lindl.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Disa thodei* Schltr. ex Kraenzl.****Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga

***Disa tripetaloides* (L.f.) N.E.Br.***Disa tripetaloides* (L.f.) N.E.Br. subsp. *tripetaloides***Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape, KwaZulu-Natal

*Very common in suitable habitats.****Disa tysonii* Bolus****Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal

***Disa venusta* Bolus***Herschelianthe venusta* (Bolus) Rauschert**Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation, collection

Distribution: Western Cape, Eastern Cape

***Disa welwitschii* Rchb.f. subsp. *welwitschii*****Status: LR-lc**

Distribution: Limpopo Province

***Disa woodii* Schltr.****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga, Gauteng, Limpopo Province

***Disa zuluensis* Rolfe****Status: LR-nt**

Endemism: Endemic

Distribution: KwaZulu-Natal, Mpumalanga

***Disperis bodkinii* Bolus****Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation  
Distribution: Western Cape  
*Tiny plants and therefore often overlooked.*

*Disperis bolusiana* Schltr. ex Bolus subsp.  
*macrocoris* (Rolfe) J.C.Manning  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Disperis concinna* Schltr.  
Status: LR-lc  
Threats: Afforestation  
Distribution: KwaZulu-Natal, Gauteng, Mpumalanga

*Disperis cooperi* Harv.  
Status: LR-lc  
Endemism: Endemic  
Threats: Afforestation  
Distribution: KwaZulu-Natal, Free State, Mpumalanga

*Disperis johnstonii* Rolfe  
Status: LR-lc  
Endemism: Endemic  
Threats: Urban expansion, agriculture, alien plant infestation, habitat degradation  
Distribution: KwaZulu-Natal  
*Not listed previously.*

*Disperis stenopteron* Rchb.f.  
Status: LR-lc  
Threats: Afforestation  
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga

*Disperis tysonii* Bolus  
Status: LR-lc  
Threats: Afforestation  
Distribution: KwaZulu-Natal, Eastern Cape, Mpumalanga

*Disperis wealei* Rchb.f.  
Status: LR-lc  
Threats: Afforestation  
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga, Limpopo Province

*Disperis woodii* Schltr.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Eastern Cape, KwaZulu-Natal

*Eulophia cooperi* Rchb.f.  
Status: LR-lc  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Free State, Gauteng, Mpumalanga, Limpopo Province

*Eulophia holubii* Rolfe  
Status: LR-lc

*Eulophia litoralis* Schltr.  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape

*Eulophia meleagris* Rchb.f.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Eastern Cape, KwaZulu-Natal

*Eulophia platypetala* Lindl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape, Eastern Cape

*Eulophia speciosa* (R.Br. ex Lindl.) Bolus  
Status: LR-lc  
Distribution: Southern and eastern provinces

*Eulophia tabularis* (L.f.) Bolus  
Status: LR-lc  
Endemism: Endemic

Distribution: Western Cape, Eastern Cape, Northern Cape

*Eulophia zeyheriana* Sond.  
Status: LR-lc  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga

*Evetolla rubiginosa* (Sond. ex Bolus) Kurzweil & H.P.Linder  
Status: LR-nt  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Western Cape  
*Dependent on fire for recruitment.*

*Habenaria bicolor* Conrath & Kraenzlin  
Status: LR-nt  
Distribution: Gauteng

*Habenaria humilior* Rchb.f.  
Status: LR-lc  
Distribution: KwaZulu-Natal, Gauteng, Limpopo Province

*Habenaria kraenzliniana* Schltr.  
Status: LR-lc  
Endemism: Endemic  
Distribution: KwaZulu-Natal, Gauteng, Limpopo Province

*Holothrix aspera* (Lindl.) Rchb.f.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape, Northern Cape

*Holothrix filicornis* Immelman & Schelpe  
Status: LR-lc  
Distribution: Northern Cape

*Holothrix grandiflora* (Sond.) Rchb.f.  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape, Eastern Cape

*Holothrix macowaniana* Rchb.f.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Eastern Cape

*Holothrix mundii* Sond.  
Status: LR-lc  
Endemism: Endemic  
Threats: Urban expansion, alien plant infestation, habitat degradation, agriculture  
Distribution: Western Cape, Eastern Cape  
*Inconspicuous; rare.*

*Holothrix pilosa* (Burch. ex Lindl.) Rchb.f.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape, Eastern Cape  
*Uncommon; not fire dependent.*

*Holothrix villosa* Lindl. var. *condensata* (Sond.) Immelman  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape, Eastern Cape  
*Should be a distinct species.*

*Huttonaea woodii* Schltr.  
Status: LR-nt  
Endemism: Endemic  
Threats: Afforestation  
Distribution: KwaZulu-Natal

*Jumellea walleri* (Rolfe) la Croix  
*Jumellea filicornoides* (De Wild.) Schltr.  
Status: LR-lc  
Distribution: KwaZulu-Natal, Limpopo Province

*Neobolusia tysonii* (Bolus) Schltr.  
Status: LR-lc  
Distribution: Eastern Cape, KwaZulu-Natal, Free State, Mpumalanga, Limpopo Province

*Nervilia bicarinata* (Blume) Schltr.  
Status: LR-lc  
Distribution: KwaZulu-Natal, Mpumalanga, Limpopo Province

*Nervilia kotschyi* (Rchb.f.) Schltr. var. *purpurata* (Rchb.f. & Sond.) Pettersson  
Status: LR-lc  
Distribution: Mpumalanga, Gauteng, North-West

*Nervilia renschiana* (Rchb.f.) Schltr.  
Status: LR-lc  
Distribution: KwaZulu-Natal

*Pachites appressa* Lindl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Pachites bodkinii* Bolus  
Status: LR-nt  
Endemism: Endemic  
Threats: Fire  
Distribution: Western Cape  
*Fire dependent species.*

*Platylepis glandulosa* (Lindl.) Rchb.f.  
Status: LR-nt  
Distribution: KwaZulu-Natal

*Polystachya albenscens* Ridl. subsp. *imbricata* (Rolfe) Summerh.  
Status: LR-lc  
Distribution: Mpumalanga, Limpopo Province

*Pterygodium newdigateae* Bolus var. *cleistogamum* Bolus  
Status: LR-nt  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Western Cape, Eastern Cape

*Pterygodium pentherianum* Schltr.  
Status: LR-lc  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Western Cape

*Pterygodium schelpi* H.P.Linder  
Status: LR-lc  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Western Cape, Northern Cape

*Satyrium carneum* (Dryand.) Sims  
Status: LR-nt  
Endemism: Endemic  
Threats: Collection, urban expansion, agriculture  
Distribution: Western Cape

*Satyrium foliosum* Sw.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Satyrium microrrhynchum* Schltr.  
Status: LR-lc  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga

*Satyrium princeps* Bolus  
Status: LR-nt  
Endemism: Endemic  
Threats: Urban expansion, alien plant infestation  
Distribution: Western Cape, Eastern Cape  
*Coastal development is a threat.*



**Satyrium rhynchanthum Balus**

Satyridium rastratum Lindl.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Schizochilus cecilii Rolfe subsp. transvaalensis**

(Rolfe) H.P.Linder

Status: LR-nt

Endemism: Endemic

Threats: Afforestation

Distribution: Mpumalanga, Limpopo Province

Threatened by pine plantations.

**Schizachilus crenulatus H.P.Linder**

Status: LR-nt

Endemism: Endemic

Distribution: Mpumalanga

**Schizochilus flexuosus Harv. ex Rolfe**

Status: LR-lc

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga

**Schizochilus zeyheri Sand.**

Status: LR-lc

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal, Free State,

Mpumalanga, Limpopo Province, Gauteng

**Schizadium abliquum Lindl. subsp. abliquum**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Stenoglottis langifolia Haak.f.**

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

Perhaps only a robust form of *S. fimbriata*.

ROSACEAE

**Cliffortia aculeata Weim.**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Cliffortia acutifolia Weim.**

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Western Cape

Escorpment near Nieuwoudtville, the main centre for the species, is poorly explored and more localities are likely to be discovered. Occurs in an arid environment with low intensity grazing and few fires.

**Cliffortia alata N.E.Br.**

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Western Cape

Occurs on farmland used for goat grazing.

**Cliffortia arborea Marloth**

Status: LR-nt

Endemism: Endemic

Threats: Harvesting

Distribution: Northern Cape

Used extensively for firewood in the past.

**Cliffortia carinata Weim.**

Status: LR-lc

Endemism: Endemic

Threats: Alien plant infestation, fire

Distribution: Western Cape

Species belongs to *C. glauca* complex, delimitation of species within this complex is uncertain.

**Cliffortia graminea L.f. var. elegans Weim.**

Status: LR-nt

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

**Cliffortia hantamensis Diels**

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Western Cape

Occurs in an arid environment with low intensity grazing and few fires.

**Cliffortia langifolia (Eckl. & Zeyh.) Weim.**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Cliffortia montana Weim.**

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: Western Cape, Eastern Cape

Very poorly collected species, highly likely to be more widespread.

**Cliffortia nivenioides Fellingham**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Cliffortia reticulata Eckl. & Zeyh.**

Status: LR-nt

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: Western Cape

Only collected a few times; collections from Riviersonderend and Kogelberg have sometimes wrongly been attributed to this species. Closely related to *C. pilifera*.

**Cliffortia strigosa Weim.**

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

Possibly nothing more than a very hairy variant of the more widespread *C. virgata*, intermediate (hybrid?) forms occur around Bainskloof.

RUTACEAE

**Acmadenia densifolia Sand.**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Acmadenia maculata I.Williams**

Status: LR-nt

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape (Eastern Cape?)

Decline not severe at present, continuous over a long period, but needs to be monitored.

**Acmadenia matraasbergensis E.Phillips**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe and widespread.

**Acmadenia mundiana Eckl. & Zeyh.**

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Safe.

**Acmadenia patentifolia I.Williams**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Acmadenia tenax I.Williams**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe where it grows, though restricted in distribution.

**Acmadenia trigonata (L.f.) Bartl. & H.L.Wendl.**

Status: LR-nt

Endemism: Endemic

Threats: Afforestation, fire, alien plant infestation

Distribution: Western Cape

Robinson Pass area searched in January 2001, but burning a year or two before had decimated the subpopulation (one seedling found). Particularly affected by *Hakea* encroachment.

**Adenandra dahlgrenii Strid**

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Safe.

**Adenandra gumifera Strid**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Adenandra marginata (L.f.) Raem. & Schult.**

subsp. *mucronata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Adenandra rotundifolia Eckl. & Zeyh.**

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Adenandra villosa (P.J.Bergius) Licht. ex Roem. & Schult.**

subsp. *apiculata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe.

**Adenandra villosa (P.J.Bergius) Licht. ex Raem. & Schult.**

subsp. *imbricata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

High altitude, inaccessible. Only one specimen at PRE.

**Adenandra villasa (P.J.Bergius) Licht. ex Roem. & Schult.**

subsp. *pedicellata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

**Adenandra villasa (P.J.Bergius) Licht. ex Raem. & Schult.**

subsp. *robusta* Strid

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

This is a lowland species.

**Adenandra villosa (P.J.Bergius) Licht. ex Roem. & Schult.**

subsp. *umbellata* (J.C.Wendl.) Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe.

**Agathosma abrupta Pillans**

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Limestone endemic.

**Agathosma acutissima Dummer**

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape

**Agathosma adenandriiflora Schltr.**

Status: LR-lc

Endemism: Endemic  
Distribution: Western Cape

*Agathosma adnata* Pillans  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma affinis* Sond.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma bicolor* Dummer  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape  
*Habitat specialist.*

*Agathosma concava* Pillans  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape  
*Habitat specialist.*

*Agathosma cordifolia* Pillans  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape  
*Very restricted distribution.*

*Agathosma dielsiana* Schltr. ex Dummer  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma florida* Sond.  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape  
*Very restricted distribution.*

*Agathosma florulenta* Sond.  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape  
*Seasonally wet limestone specialist.*

*Agathosma foetidissima* (Bartl. & Wendl.) Steud.  
Status: LR-nt  
Endemism: Endemic  
Threats: Agriculture, grazing/browsing  
Distribution: Western Cape  
*If number of locations drops to fewer than ten, this species will become vulnerable. Affected by trampling.*

*Agathosma foleyana* Dummer  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape  
*Habitat specialist.*

*Agathosma leptospermoides* Sond.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma linifolia* (Roem. & Schult.) Bartl. & Wendl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma longicornu* Pillans  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma martiana* Sond.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Eastern Cape

*Agathosma namaquensis* Pillans  
Status: LR-lc  
Endemism: Endemic  
Threats: Fire  
Distribution: Northern Cape  
*Restricted to only a few peaks.*

*Agathosma ovata* (Thunb.) Pillans  
Status: LR-lc  
Distribution: Eastern Cape, Western Cape, KwaZulu-Natal

*Agathosma planifolia* Sond.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma scaberula* Dummer  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma serpyllacea* Licht. ex Roem. & Schult.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Eastern Cape, Western Cape

*Agathosma squamosa* (Roem. & Schult.) Bartl. & H.L.Wendl.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma stenosepala* Pillans  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma stokoei* Pillans  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Agathosma uncarpellata* (Fourc.) Pillans  
Status: LR-lc  
Endemism: Endemic  
Distribution: Eastern Cape

*Diosma arenicola* I.Williams  
Status: LR-nt  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

*Diosma awilana* I.Williams  
Status: LR-nt  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

*Diosma demissa* I.Williams  
Status: LR-lc  
Endemism: Endemic  
Threats: Fire  
Distribution: Western Cape

*Diosma tenella* I.Williams  
Status: LR-nt  
Endemism: Endemic  
Threats: Afforestation, agriculture  
Distribution: Western Cape  
*Extinct in many historically recorded localities.*

*Euchaetis esterhuyseniae* I.Williams  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape  
*Safe on high mountains.*

*Euchaetis laevigata* Turcz.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape  
*Should possibly be listed as Not Threatened.*

*Euchaetis linearis* Sond.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Euchaetis meridionalis* I.Williams  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Euchaetis pungens* (Bartl. & H.L.Wendl.) I.Williams  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Euchaetis schlechteri* Schinz  
Status: LR-nt  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape  
*May have been largely eliminated by cultivation.*

*Macrostylis villosa* (Thunb.) Sond. subsp. *villosa*  
Status: LR-nt  
Endemism: Endemic  
Threats: Urban expansion, alien plant infestation  
Distribution: Western Cape  
*Many areas where it once flourished are now transformed by urbanisation and alien vegetation.*

## SOLANACEAE

*Solanum africanum* Mill.  
*Solanum crassifolium* Lam.  
Status: LR-lc  
Endemism: Endemic  
Synonym was listed by Hilton-Taylor.

## THYMELAEACEAE

*Englerodaphne pilosa* Burtt Davy  
Status: LR-lc  
Endemism: Endemic  
Distribution: Gauteng, Eastern Cape, KwaZulu-Natal  
*Fairly common in Natal Midlands and Eastern Cape forests.*

*Gnidia leipoldtii* C.H.Wright  
Status: LR-lc  
Endemism: Endemic  
Distribution: Northern Cape, Eastern Cape

*Gnidia parviflora* Meisn.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Gnidia scabrada* Meisn.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Lachnaea eriocephala* L.  
*Lachnaea purpurea* Andrews  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape

*Lachnaea glomerata* Fourc.  
Status: LR-lc  
Endemism: Endemic  
Distribution: Western Cape, Eastern Cape

*Lachnaea striata* (Poir.) Meisn.  
Status: LR-nt  
Endemism: Endemic  
Distribution: Western Cape  
*Last collection was made in 1971. It appears to be very scarce.*



*Passerina ericoides* L.

Status: LR-nt

Endemism: Endemic

Threats: Urban expansion, alien plant infestation

Distribution: Western Cape

Large portions of coast along Cape Peninsula affected by human impact and alien vegetation of Cape Town area.

*Passerina esterhuyseniae* Bredenk. & A.E.van Wyk

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

High mountain tops, restricted distribution, small subpopulations.

*Passerina filiformis* L. subsp. *glutinosa* (Thoday)

Bredenk. & A.E.van Wyk

Status: LR-nt

Endemism: Endemic

Threats: Urban expansion, alien plant infestation

Distribution: Western Cape

Deep acid sands on flats, heavily transformed, and a small proportion conserved.

*Passerina nivicola* Bredenk. & A.E.van Wyk

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape, Western Cape

Occurring in snow about four months per annum.

*Struthiola congesta* C.H.Wright

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

*Struthiola pondoensis* Gilg ex C.H.Wright

Status: LR-lc

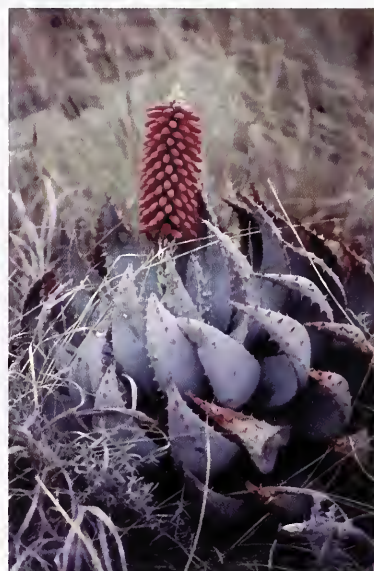
Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal



*Frithia pulchra* is one of the few mesemb genera from the summer rainfall area. This species is known from only two subpopulations.

(Photo: P. Burgoyne)



*Aloe peglerae*, an endangered endemic. (Photo: NBI)



Black Mountain, a gem that is close to the heart of the world's most arid hotspot, the Succulent Karoo.

(Photo: P. Burgoyne)

## AIZOACEAE

*Conophytum lithopsoides* L.Bolus subsp. *boreale* (L.Bolus) S.A.Hammer  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Northern Cape  
*Type locality vague, never rediscovered.*

## ALOACEAE

*Aloe cooperi* Baker subsp. *pulchra* Glen & D.S.Hardy  
**Status: DD**  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal

*Aloe gracilis* Haw. var. *decumbens* Reynolds  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape

*Aloe modesta* Reynolds  
**Status: DD**  
 Endemism: Endemic  
 Threats: Collection, afforestation  
 Distribution: Mpumalanga, KwaZulu-Natal  
*Inconspicuous and unknown. Known to be illegally collected.*

*Aloe parviflora* Baker  
**Status: DD**  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal  
*Inconspicuous grass aloes.*

*Aloe vogtsii* Reynolds  
**Status: DD**  
 Endemism: Endemic  
 Threats: Afforestation, agriculture, urban expansion  
 Distribution: Limpopo Province

## AMARYLLIDACEAE

*Apodolirion amiana* D.Mull.-Doblies  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*The description of this species was published in 1984, but the types have never been distributed to herbaria.*

*Apodolirion bolusii* Baker  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Known only from the type collection; taxonomically valid but undercollected because flowers are extremely ephemeral and appear in mid-summer.*

*Apodolirion macowanii* Baker  
**Status: DD**  
 Endemism: Endemic  
 Threats: Urban expansion, habitat degradation  
 Distribution: Eastern Cape  
*This species has been seldom collected, mainly prior to the 1950s. The only subpopulation seen was on the Farm Slooikrool outside Grahamstown, where the habitat was very degraded through grazing. Heavy cattle farming is reported as being a serious threat.*

*Gethyllis britteniana* Baker subsp. *bruynsii* D.Mull.-Doblies  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Northern Cape  
*Only known from the type.*

*Gethyllis britteniana* Baker subsp. *herrei* (L.Bolus) D.Mull.-Doblies  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Northern Cape  
*Only known from the type.*

*Gethyllis fimbriatula* D.Mull.-Doblies  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Known only from description. Probably a local form of the widespread G. lanuginosa Morl.*

*Gethyllis latifolia* Masson ex Baker  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Material from near Vredenburg matches the type. This is probably a local form of the widespread G. ciliaris (Thunb.) Thunb.*

*Nerine gibsonii* Douglas  
**Status: DD**  
 Endemism: Endemic  
 Threats: Habitat degradation  
 Distribution: Eastern Cape

*Nerine* sp. A Bayer 52  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape  
*May be a local form of the widespread N. humilis (Jacq.) Herb.*

## APOCYNACEAE

*Brachystelma comptum* N.E.Br.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape

*Brachystelma gracillimum* R.A.Dyer  
**Status: DD**  
 Endemism: Endemic  
 Distribution: KwaZulu-Natal

*Brachystelma hirtellum* Weim.  
**Status: DD**  
 Distribution: Possibly not in South Africa  
*Waterberg species is B. pilasum.*

*Brachystelma micranthum* E.Mey.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape

*Brachystelma schoenlandianum* Schltr.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape

*Brachystelma tabularium* R.A.Dyer  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Probably B. circinatum—tips of corolla sometimes inflex in cultivation; corolla matches B. circinatum.*

*Ceropegia barbata* R.A.Dyer  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape?

*Ceropegia bowkeri* Harv. subsp. *bowkeri*  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape

*Ceropegia dubia* R.A.Dyer  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape

*Ceropegia occidentalis* R.A.Dyer  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Northern Cape  
*Similar to C. africana, may be conspecific.*

*Ceropegia rudatisii* Schltr.  
**Status: DD**  
 Endemism: Endemic  
 Threats: Agriculture  
 Distribution: KwaZulu-Natal  
*Probably CR or EX; not seen in recent years. Threatened by sugarcane and banana plantations.*

*Ceropegia tomentosa* Schltr.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape

## ASTERACEAE

*Alciope lanata* (Thunb.) DC.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape  
*Could be extinct in the wild; not collected during the 20<sup>th</sup> century.*

*Gnaphalium nelsonii* Burtt Davy  
**Status: DD**  
 Endemism: Endemic  
 Threats: Urban expansion  
 Distribution: North-West, Gauteng  
*Seldom collected.*

*Helichrysum archeri* Compton  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape

*Helichrysum leptorhizum* DC.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Northern Cape  
*Lost collected in 1897. Possibly extinct.*

*Othonna linearifolia* (DC.) Sch.Bip.  
*Doria linearifolia* DC.  
**Status: DD**  
 Endemism: Endemic

*Othonna pinnatilobata* Sch.Bip.  
**Status: DD**  
 Endemism: Endemic

*Othonna tephrosioides* Sond.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Western Cape

*Senecio erysimoides* DC.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Northern Cape

*Senecio microspermus* DC.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Eastern Cape  
*Taxonomic problem. Not collected after Drège in 1835.*

*Senecio thunbergii* Harv.  
**Status: DD**



Endemism: Endemic  
Distribution: Western Cape?  
*Toxonomic problem.*

**Senecio trachylaenus** Harv.  
Status: DD  
Endemism: Endemic  
Distribution: Northern Cape  
*Toxonomic problem.*

**Senecio trachyphyllus** Schltr.  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Toxonomic problem.*

## CAMPANULACEAE

**Prismatocarpus fastigiatus** C.Presl ex A.DC.  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Possibly known only from type.*

**Roella latiloba** A.DC.  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape

**Wahlenbergia annuliformis** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia asperifolia** Brehmer  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Lost collected in 1900. Needs revision.*

**Wahlenbergia bolusiana** Schltr. & Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia bowkeriae** Sond.  
Status: DD  
Endemism: Endemic  
Distribution: Eastern Cape  
*Known from type only.*

**Wahlenbergia buseriana** Schltr. & Brehmer  
Status: DD  
Endemism: Endemic  
Distribution: Northern Cape  
*Known from type only.*

**Wahlenbergia compacta** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia debilis** H.Buek  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia distincta** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia divergens** A.DC.  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia dunantii** A.DC.  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia effusa** (Adamson) Lammers  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape

**Wahlenbergia floribunda** Schltr. & Brehmer  
Status: DD  
Endemism: Endemic  
Distribution: Northern Cape

**Wahlenbergia lasiocarpa** Schltr. & Brehmer  
Status: DD  
Endemism: Endemic  
Distribution: Northern Cape

**Wahlenbergia longispala** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia massonii** A.DC.  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Known from type only.*

**Wahlenbergia mollis** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia oligotricha** Schltr. & Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia polyclada** A.DC.  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape

**Wahlenbergia ramifera** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia rara** Schltr. & Brehmer  
Status: DD  
Endemism: Endemic  
Distribution: Northern Cape

**Wahlenbergia roelliflora** Schltr. & Brehmer  
Status: DD  
Endemism: Endemic  
Distribution: Northern Cape  
*Known from type only.*

**Wahlenbergia saxifragoides** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia schistacea** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia serpentina** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia subpilosa** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia subtilis** Brehmer  
Status: DD  
Endemism: Endemic  
*Toxonomic problem.*

**Wahlenbergia tomentosula** Brehmer  
Status: DD

Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

**Wahlenbergia tumida** Brehmer  
Status: DD  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape, Northern Cape

## CONVOLVULACEAE

**Merremia malvifolia** Rendle  
Status: DD  
Endemism: Endemic  
Distribution: Eastern Cape  
*Possibly extinct. Lost collected in 19<sup>th</sup> century.*

## CYPERACEAE

**Ficinia micrantha** C.B.Clarke  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape

**Isolepis inconspicua** (Levy) J.Raynal  
*Scirpus inconspicua* Levyns  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Requires taxonomic study.*

**Schoenoxiphium strictum** Kukkonen  
Status: DD  
Endemism: Endemic  
Distribution: KwaZulu-Natal  
*Known only from type.*

**Scirpus delicatulus** (Nees) Levyns  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Is on Isolepis species; may be a synonym of Scirpus bulbiferus Boeck. Toxonomic evolution required.*

**Tetraria paludosa** Levyns  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Requires taxonomic evolution: related to common and widespread T. cuspidata (Rottb.) C.B.Clarke.*

## DIPSACACEAE

**Cephalaria decurrens** (Thunb.) Roem. & Schult.  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape  
*Not collected since 19<sup>th</sup> century, possibly extinct.*

## LOBELIACEAE

**Cyphia bolusii** E.Phillips  
Status: DD  
Distribution: KwaZulu-Natal, Mpumalanga

**Cyphia comptonii** Bond  
Status: DD  
Endemism: Endemic  
Distribution: Western Cape

**Cyphia corylifolia** Harv.  
Status: DD  
Endemism: Endemic  
Distribution: KwaZulu-Natal

**Cyphia dentariifolia** C.Presl var. *dentariifolia*  
Status: DD

Endemism: Endemic  
Distribution: Western Cape

**Cyphia longiflora** Schltr.  
**Status: DD**  
Endemism: Endemic  
Distribution: Northern Cape

**Cyphia longilobata** E.Phillips  
**Status: DD**  
Endemism: Endemic  
Distribution: Cape

**Cyphia ranunculifolia** E.Wimm.  
**Status: DD**  
Endemism: Endemic  
Distribution: Cape

**Cyphia tortilis** N.E.Br.  
**Status: DD**  
Endemism: Endemic  
Distribution: Eastern Cape

**Lobelia oreas** F.Wimmer  
**Status: DD**  
Endemism: Endemic  
Distribution: KwaZulu-Natal  
*Toxonomic status of this plant uncertain, related to the widespread L. flaccida.*

**Wimmerella bifida** (Thunb.) L.Serra, M.B.Crespo & Lammers  
*Laurentia giftbergensis* (E.Phillips) F.Wimmer  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape  
*L. giftbergensis is doubtfully distinct from the common and widespread W. bifida; if recognised probably rates as VU D2.*

## ORCHIDACEAE

**Corycium bifidum** Sond.  
**Status: DD**  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Western Cape

**Disa galpinii** Rolfe  
**Status: DD**  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Eastern Cape, KwaZulu-Natal

**Disa pygmaea** Bolus  
*Manadenia pygmaea* (Bolus) T.Durand & Schinz  
**Status: DD**  
Endemism: Endemic  
Threats: Urban expansion, agriculture  
Distribution: Western Cape

**Disa sanguinea** Sond.  
**Status: DD**  
Endemism: Endemic  
Distribution: Eastern Cape, KwaZulu-Natal

**Oberonia disticha** (Lam.) Schltr.  
**Status: DD**  
Distribution: Limpopo Province

**Polystachya zuluensis** L.Bolus  
**Status: DD**  
Distribution: KwaZulu-Natal

**Schizochilus gerrardii** (Rchb.f.) Bolus  
**Status: DD**  
Endemism: Endemic  
Threats: Afforestation  
Distribution: KwaZulu-Natal  
*Threatened by pine plantations.*

**Schizochilus lilacinus** H.P.Linder  
**Status: DD**  
Endemism: Endemic  
Distribution: Mpumalanga

## ROSACEAE

**Cliffortia crenulata** Weim.  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape  
*Only collected once in 1894. Locality is imprecise, but the altitude fits the lower slopes of the mountains around Riversonderend. Possibly a variant of C. varians, a more recently collected, but still localised species.*

**Cliffortia cymbifolia** Weim.  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape

**Cliffortia intermedia** Eckl. & Zeyh.  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape

**Cliffortia multiformis** Weim.  
**Status: DD**  
Endemism: Endemic

## RUTACEAE

**Acmadenia baileyensis** I.Williams  
**Status: DD**  
Endemism: Endemic  
Threats: Urban expansion  
Distribution: Western Cape  
*Inaccessible locality.*

**Adenandra multiflora** Strid  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape

**Agathosma alaris** Cham.  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape?  
*Extinct? No specimens in PRE.*

**Agathosma sabulosa** Sond.  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape  
*Possibly a synonym of A. involucrata.*

**Agathosma** sp. Bean 480  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape

**Diosma aspalathoides** Lam.  
**Status: DD**  
Endemism: Endemic  
Threats: Urban expansion  
Distribution: Western Cape

**Diosma dichotoma** P.J.Bergius  
**Status: DD**  
Endemism: Endemic  
Threats: Urban expansion  
Distribution: Western Cape

**Diosma guthriei** P.E.Glover  
**Status: DD**  
Endemism: Endemic  
Threats: Agriculture  
Distribution: Western Cape

**Macrostylis cauliflora** I.Williams  
**Status: DD**  
Endemism: Endemic  
Distribution: Western Cape

## THYMELAEACEAE

**Gnidia singularis** Hilliard  
**Status: DD**  
Distribution: KwaZulu-Natal



**Gerrardanthus tomentosus**, a caudiciform, is classified as *Rare* (Hilton-Taylor, 1996) and is known only from a few specimens in the Durban Metropole. (Photo: R. Symmonds)



**Conophytum burgeri** is cryptic amongst the quartzite pebbles of the Succulent Karoo. (Photo: P. Burgoyne)



# Swaziland



Titus S. Dlamini\* & Gideon M. Dlamini\*

## Introduction

Swaziland has a human population of about one million and a total area of more than 17,000 km<sup>2</sup>. The vegetation of Swaziland ranges from open grassland to forest, and from semi-arid savanna to wetlands. Owing to steep gradients of climate, topography (altitude range is 90–1,862 m), and edaphic characteristics, the country's flora is extraordinarily rich. Swaziland is divided into four distinct physiographic zones, running from north to south: Highveld, Middleveld, Lowveld, and the Lebombo Plateau. Rainfall is highest in the Highveld and lowest in the Lowveld; most of the rain (about 85%) falls in summer.

The main authoritative work on the flora of Swaziland was undertaken by Compton (1976). Subsequent updates to this work have been compiled by Kemp (1981, 1983) and Braun (<http://www.sntc.org.sz/biodiversity/sdflora.html>). Although plant collecting for herbarium purposes has been taking place since the late 1800s, it has been sporadic. Braun & Dlamini (1994), therefore, emphasised that to conserve threat-

ened plant species in Swaziland, more field investigations need to take place and collecting intensity ought to be augmented. This was substantiated in an analysis of herbarium collections from two adjacent 25 km<sup>2</sup> grid cells—it was found that one contained 15 times more species than the other (1,177 compared to 87 species). This gross disparity was attributed to a higher collecting intensity in protected areas compared to unprotected areas in Swaziland (Braun & Dlamini 1994).

Although the country's knowledge of its indigenous flora is still at a developmental stage, current records indicate that there are over 3,400 species of higher plants in Swaziland, representing 771 genera in 135 families. The Swaziland National Herbarium (SDNH) holds about 7,450 specimens of higher plants.

Moreover, compared to the other southern African countries, Swaziland forms less than 1% of the land area, yet it contains almost 11% of the taxa recorded in the region. About 4% of the country is formally protected; the main focus is the conserva-

**Capital:** Mbabane, largest town

**Area:** 17,365 km<sup>2</sup>

**Languages:** English, Swazi (both official)

**Currency:** Emalangeni (E), on a par with South African Rand

**Total plant species:** 3,400

**Total plant endemics:** 12

**Total RDL plants:** 305

**Focal RDL institutions:** SDNH

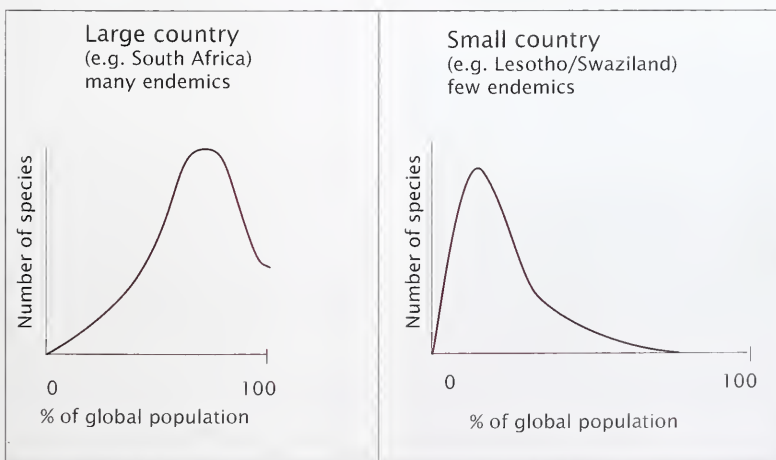
**Number of Protected Areas:** six nature reserves managed by the SNTC, three managed by the Big Game Parks.

**Population:** 1,091,470 **Growth Rate:** 2.9% **Density:** 55.7 people/km<sup>2</sup>

**Phytogeography:** Predominantly Tonga–Pondoland Regional Mosaic, with Kalahari–Highveld Regional Mosaic in the west.

**Flora:** North Eastern Mountain Grassland to the west of the country with pockets of Afromontane forest merging eastwards into savanna scrub woodlands (mainly Sour Lowveld Bushveld, Sweet Lowveld Bushveld and Lebombo Arid Mountain Bushveld).

**Sources:** Anonymous 2000, Braun & Dlamini 1994, Low & Rebelo 1998, Stuart & Adams 1990, White 1983



**Figure 1.** In a small country, most species tend to have a small share of the total global population of a species, whereas very few or none are endemic to the country (adapted from Gärdenfors *et al.* 1999).

\*National Herbarium, Malkerns, Swaziland

**Table 1. Number of taxa in each category on the Swaziland RDL.**

RDL status	Number of taxa
Extinct (EX)	3
Extinct in the Wild (EXW)	1
Critically Endangered (CR)	15
Endangered (EN)	29
Vulnerable (VU)	18
Lower-Risk near threatened (LR-nt)	16
Lower-Risk least concern (LR-lc)	68
Data Deficient (DD)	155
<b>Total</b>	<b>305</b>

tion of fauna, but plants do enjoy a high level of protection in reserves. Much of the biodiversity is on Swazi Nation Land (under traditional leadership) and on Title Deed Land (under private ownership).

### Methods

Hilton-Taylor's (1996a) work formed the basis for this RDL. Our objective was to subject the "1996 RDL taxa" to a wide audience for re-assessment, to integrate new data, and to evaluate the conservation status of additional species. In addition to information in Hilton-Taylor (1996a), herbarium specimen data from PRECIS, PRE, SDNH, and databases belonging to Kate Braun were used as complementary starting points for making raw estimates (see Golding & Smith 2001). Herbarium collections by Braun, Compton, Culverwell, Dlamini, Dyer, and Kemp, to name but a few, also provided useful data. As there are many undercollected areas in Swaziland, we also relied on field observations of workshop participants to supplement recorded information. Additional taxa for RDL assessments were sourced from recent Environmental Impact Assessment studies.

The working approach adopted for the compilation of this RDL was to bring together botanists who work across the country to enable them to share their experiences relating to field observations and gen-

eral botanical knowledge. Three workshops were held between September 2000 and March 2001.

During the first workshop, the participants were familiarised with the IUCN RDL system of categories and criteria (IUCN 1994) so that a common understanding of their application could be reached. The IUCN 1994 Categories and Criteria were used to assess the conservation status; principles by Gärdenfors *et al.* (1999) served as a guide for assigning RDL categories at a national level for a country as small as Swaziland. Compared to large-sized countries, small countries tend to hold a smaller proportion of the global distribution of species, and hence, are likely to have fewer species confined within its borders (Figure 1). Theoretically, this meant that virtually the entire flora of Swaziland could have been placed on the RDL based on a narrow distribution range. To prevent this, species with approximately 20% or less of their global range (or global population) within the political borders of Swaziland were excluded from the RDL assessment process. Exceptions were made in cases where a species was known to be utilised or of some charismatic value.

### Results and Discussion

In total, 305 taxa appear on the RDL for Swaziland (Table 1). This is a very high

**Table 2. The ten families with the highest representation on the Swaziland RDL.**

Family	Number of taxa
Apocynaceae <i>sensu lato</i>	31
Asteraceae	27
Lamiaceae	22
Asphodelaceae	21
Fabaceae	14
Orchidaceae	13
Iridaceae	12
Crassulaceae	10
Euphorbiaceae	10
Gesneriaceae	10

**Table 3. Endemism on the Swaziland RDL.**

Endemism	Number of taxa
Confirmed endemic	12
Suspected endemic	7
Confirmed near-endemic	35
Suspected near-endemic	5
<b>Total</b>	<b>59</b>

number of species, considering the size of the country.

### Red Data List

Some 66 taxa (22%) that appear on the RDL are threatened (CR, EN, and VU). More than 50% have been categorised as *Data Deficient*; this clearly underlines the need for future work, particularly because some of the categories could not be used owing to the quantitative nature of their requirements (see Braun & Dlamini 1994). This lack of information is a result of the fact that the bulk of these assessments are based on herbarium collections and the degradation of localities, rather than on solid field evidence for the impacts of threatening processes on population decline. Herbarium data from PRECIS were sometimes found to be unreliable—often there were no records from Swaziland, or if there were, they were either single or poorly known. However, supplementing PRECIS information with other herbarium data sources held in Swaziland was very useful.

The main families represented on the RDL are the Apocynaceae, Asteraceae, Lamiaceae, and Asphodelaceae (Table 2). Most of these taxa are utilised for medicinal and ornamental purposes. The figures also reflect on how well-known these families are in terms of their representation in herbaria and the literature.

Another bias we encountered was the disparity between protected and unprotected areas. We found that the most reliable field records came from Malolotja and Mlawula Nature Reserves, and to a lesser extent, from other protected areas. Malalotja and Mlawula, which have a combined land area of 2% of the size of Swaziland, collectively contain 60% of all the species recorded in Swaziland (Braun & Dlamini 1994). The reason for this disparity is that more taxonomic and ecological studies have been carried out within protected areas than outside the protected area system.



Moreover, most endemics and near-endemics come from the Swaziland border areas of the Lebombo Mountains (KwaZulu-Natal) and from Barberton (Mpumalanga), as well as elements of the Maputaland Centre of Endemism, which Swaziland shares with Mozambique and South Africa (KwaZulu-Natal). Kemp (1983) recognised only four country endemics for Swaziland, whereas Braun & Dlamini (1994) estimated that there are at least 25 species (Table 3). It is our view that true levels of endemicity will only be determined through field surveys along the Swaziland border, particularly the Lebombo Mountains, and that this be coupled with taxonomic activities.

### Threats

The following key threats to the flora of Swaziland are recognised, though they are not formally documented for the country:

- Destruction or alteration of habitats through infrastructural development (urbanisation) and vegetation-clearing for food crops (maize, sorghum, and beans).
- Invading exotic species such as *Lantana camara*, *Sesbania punicea*, and *Chromolaena odorata* displace indigenous species and certainly have an effect on RDL species. Unfortunately, the ecological impact of alien invaders on threatened species in Swaziland has not yet been scientifically studied.
- Increasing human settlement owing to population expansion.

### Conservation Legislation

Recently, the country has established the Swaziland Environmental Authority, a national body responsible for overseeing environmental protection. There are several legal instruments that cater for conservation issues residing in different government departments, but most of these legal structures are outdated. The Government of Swaziland is revisiting legislation, and the Flora Protection Bill of 2000 has been signed by His Majesty the King and turned into law. The Flora Protection Act of 2001 lists 206 protected plant species.

The Swaziland RDL is expected to work hand in hand with these legal instruments, which are expected to safeguard plant biodiversity. The Swaziland Environmental Authority Act of 1992 stipulates that prior to commencement of major development projects an Environmental Impact Assessment (EIA) should be carried out

and proper mitigation measures should be guaranteed. The Act further calls for special attention to be given to plants of high conservation status in the EIA studies. This updated RDL will enable the enforcement of this requirement. Therefore, within the above-stated legal framework, Swaziland finds herself in a favourable position to enforce the RDL.

### Conclusion

The RDL account presented here is far more comprehensive than previous attempts. This is a result of consultation with relevant stakeholders, who must be commended for their dedication and effort.

Owing to the dynamic nature of species losses, this work is not final and the RDL will certainly undergo future changes. However, we emphasise that this RDL is an additional and useful document for the

Flora Protection Act, as it will enable closer monitoring of Swaziland's flora. To make this a reality, formal field studies on plant community structures, population dynamics, and utilisation patterns of plant species of commercial value have to be carried out in future.

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Participants at the Red List workshop in Mbabane. (Photo: J.S. Golding)



Invasive alien encroachment constitutes a major threat to biodiversity in Swaziland. (Photo: J.S. Golding)

# EXTINCT & THREATENED

## ACANTHACEAE

**Duvernoia aconitiflora** A.Meeuse  
Status: EN B1B2cD2

Threats: Urban expansion  
Distribution: Ingwavuma Gorge (Lebombo District)  
Could be in forest or grassland. The closest locality to Swaziland is in the southern highveld in South Africa, some 100 km away. High human population growth in the area constitutes a threat.

## ALOACEAE

**Aloe albida** Stapf

Status: EN B1B2cde

Endemism: Near-endemic

Distribution: Malolotja, Piggs Peak

Tips into Swaziland from the Borberton oreo in South Africa. Borberton is the type locality. Apparently only one locality outside Swaziland.

**Aloe chortolirioides** A.Berger var. *chortolirioides*

*Aloe chortolirioides* A.Berger var. *boostii* (Letty) Reynolds

Status: EN B1B2abC2a

Distribution: Bulembu area, Barberton Mountains, Malolotja, Hawane Waterfall, Piggs Peak (gold mine)  
On rocky open outcrops. Is a fire-dependent species. Was listed as Rare for Swaziland in previous RDLs. The red form is found in the Bulembu oreo. Common between Bulembu (Swaziland) and Barberton Mountains (South Africa). Generally known from Limpopo Province and Mpumalanga in South Africa.

**Aloe dewettii** Reynolds

Status: EN A1acd

Threats: Collection

Distribution: Hlatikulu (Grand Valley)

Listed by WCMC's RDL as Vulnerable for Swaziland and previously Rare. Previously found in the Hlatikulu (1970s), but could not be found there recently. Is a spotted-leaf oloe eaten by people. Threatened by a high population density.

**Aloe ecklonis** Salm-Dyck

*Aloe kraussii* Baker; *Aloe boylei* Baker

Status: VU B1B2cD2

Distribution: Malolotja area, Forbes Reef, between Motjane and Oshoek

Tips into Swaziland. Mainly a South African distribution. Very common and widespread in South Africa.

**Aloe kniphofioides** Baker

Status: VU A2cB1B2c

Threats: Collection, harvesting, grazing, fire, urban expansion

Distribution: Malolotja, Forbes Reef, Nyonyane Sisa Ranch, Bulembu, Mbabane, Mankayane

Grass alae. Common in Malolotja. Not protected in Forbes Reef. Used in Nyonyane Sisa. Medicinal usage, cattle and resettlement are further threats. Widespread in South Africa.

**Aloe minima** Baker var. *minima*

*Aloe minima* Baker var. *blydeni* (Groenew.) Reynolds;

*Aloe porviflora* Baker

Status: VU A1cB1B2bD1

Endemism: Near-endemic?

Threats: Road network

Distribution: Forbes Reef, Malolotja, Ngwenya, Motjane

Scattered. Very small and inconspicuous. In previous RDLs, considered Rare in Swaziland. Very common in South Africa (Limpopo Province and Mpumalanga).

## AMARYLLIDACEAE

**Cyrtanthus nutans** R.A.Dyer

Status: EN A1c

Threats: Damming

Distribution: Komati Bridge, Magwya Farm area, between Piggs Peak and Mbabane

**Haemanthus paucilifolius** Snijman & A.E.van Wyk

Status: VU C2bD2

Endemism: Near-endemic

Threats: Damming, grazing

Distribution: Maguga

Found along the Komati River. Recently discovered in Swaziland from only one locality. In South Africa, it is known from only a few localities in fairly close proximity to the Swaziland border.

## ANACARDIACEAE

**Lannea antiscorbutica** (Hiern) Engl.

Status: EN DB1B2aC2b

Endemism: Near-endemic

Distribution: Umbeluzi Gorge (Mlawula)

Previously only known from a single locality in South Africa near the Swaziland-Mozambique border.

## APOCYNACEAE

**Adenium multiflorum** Klotzsch

Status: EN A2cdB1B2abcC1

Threats: Agriculture

Distribution: Near Tambuthi, Big Bend

Very restricted in Swaziland. One large scattered subpopulation. Sugarcone forming and lower Usuthu development ore threats. Well represented outside Swaziland. The species nomenclature is not always recognised or in use in other countries.

**Adenium swazicum** Stapf

Status: EN A1acdB1B2abed

Endemism: Near-endemic

Threats: Agriculture, damming, collection, alien plant infestation, habitat degradation

Distribution: West of Lebombo, Big Bend area and northwards

Thorny thicket on brackish plains. This succulent is protected by legislation. Its habitat is also very fragmented. Distribution mainly from north of Komatiport in South Africa to Big Bend in Swaziland. The main threat is urban development.

## ASCLEPIADACEAE

**Asclepias eminens** (Harv.) Schltr.

Status: VU B1B2cD2

Threats: Grazing, soil erosion, fire

Distribution: Mpisi, Malkerns, St. Josephs, Hlatikulu, Manzini

A widely scattered but uncommon species. In Zimbabwe it is a distinct ecotype. Edible plant.

**Brachystelma coddii** R.A.Dyer

Status: EN B1B2cC2aD

Distribution: Malolotja, Bamvu Ridge, Mbabane, Piggs Peak

Three records in Swaziland, including from a protected area, by Compton, Braun and Kemp.

**Brachystelma swazicum** R.A.Dyer

Status: EX?

Endemism: Near-endemic?

Distribution: Rocky hills northeast of Mbabane, (Malandzela Area, on the road to Maphalaleni)

Known from two records in Swaziland by Compton and Kemp in Mbabane.

**Ceropegia camiciodora** Oberm.

Status: EN B1B2c

Threats: Grazing

Distribution: Ingwavuma Poort

Restricted distribution. In a previous RDL, it is considered Endangered in South Africa's former Transvaal. Found in a restricted oreo. Grazing by cattle is a threat.

**Orbeopsis gerstneri** (Letty) L.C.Leach subsp. *gerstneri*

Status: EN B1B2c

Endemism: Endemic

Threats: Habitat degradation, grazing

Distribution: Ingwavuma Poort

One subpopulation said to be in Swaziland, but further taxonomic scrutiny is required. Partial habitat decline induced by cattle grazing is a threat.

**Pachycarpus stelliceps** N.E.Br.

Status: EX

Endemism: Endemic

Distribution: Mbabane

Only known from the type collection made near Mbabane. Reported to be extinct.

## ASPHODELACEAE

**Kniphofia tysonii** Baker subsp. *lebomboensis* Codd

Status: CR A2B1B2bceC1C2b

Endemism: Near-endemic

Threats: Collection, alien plant infestation, road network

Distribution: Lebombo (South of Stegi)

Grew in a pan, but a road has been developed near the locality. High density area. Used for its medicinal properties. Reported to occur in South Africa.

**Kniphofia umbrina** Codd

Status: CR B1B2ce

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: Mbabane, Forbes Reef, Hwane

Confined to small oreo near Mbabane. Only eight very small subpopulations are known. It is highly fragmented and declining due to habitat destruction.

## ASTERACEAE

**Aster pseudobakeranus** Lippert

Status: VU D2

Endemism: Endemic

Distribution: Poliniene River, Ukuthula (Mbabane Division), Verdun (Hlatikulu Division)

Restricted distribution.

**Helichrysum milleri** Hilliard

Status: VU D2

Endemism: Near-endemic

Distribution: Barberton Mountains

On forest margins in grassland. Known mainly from the Barberton mountains in South Africa.

## CANELLACEAE

**Warburgia salutaris** (Bertol.f.) Chiov.

Status: CR A1bcd

Threats: Collection

Distribution: Malolotja, possibly in Lomati Valley

Only six trees observed outside protected areas in Swaziland (as reported by conservation authorities in Swaziland). Very few individuals in protected areas, but these are regenerating and are currently not being utilised.



## CAPPARACEAE

*Bachmannia woodii* (Oliv.) Gilg

Status: CR B1B2cC2a

Distribution: Jilobi

Only one record for this species in Swaziland.

## CARYOPHYLLACEAE

*Dianthus moiensis* F.N.Williams subsp. *kirkii*

(Burt Davy) Hooper

Status: VU C1C2a

Threats: Collection

Distribution: Malolotja, Piggs Peak, Usuthu, Maguga

Dam

In South Africa, found in the Mogoliesberg and Witwatersrand (possibly declining over much of its range). Has horticultural potential. In Swaziland, it is used to make the royal soup for the King. The Swaziland subpopulations are scattered and locally rare. Utilisation is a serious threat.

## CRASSULACEAE

*Crassula vaginata* Eckl. & Zeyh. subsp. *minuta* Eckl. & Zeyh.

Status: CR A1cB1B2ab

Endemism: Near-endemic

Threats: Urban expansion, habitat degradation

Distribution: North of Mbabane (possibly Nkwalini landfill site)

Found on rocky granite hills. Could be extirpated in the next five to ten years. Landfill site is a serious threat to locality, seriously threatened. The species is known only from this site in Swaziland.

## ERICACEAE

*Erica swaziensis* E.G.H.Oliv.

Status: EN B1B2aD

Endemism: Endemic

Distribution: Mbabane, Forbes Reef, Black Umbeluzi Valley

Hos o very localised distribution around Mbabane. Wetland species.

## EUPHORBIACEAE

*Euphorbia keithii* R.A.Dyer

Status: CR B1B2ceC2a

Endemism: Near-endemic

Threats: Agriculture, urban expansion, habitat degradation, forestry exploitation, harvesting, alien plant infestation

Distribution: Stegi, Usuthu Gorge (?), Sitsatsaweni (northeast of Siteki), Oribi Ranch, Mlawula  
Species protected under CITES. Habitat specific, habitat decline. Species prefers hot, dry, exposed areas. Restricted to the Lebombo Mountains.

*Heywoodia lucens* Sim

Status: EN B1B2cC2aD

Distribution: Jilobi, Siteki

Recorded in Swaziland by Kemp and Miller.

## GESNERIACEAE

*Streptocarpus confusus* Hilliard subsp. *confusus* var. *confusus*

Status: EN A1cB1B2bc

Endemism: Near-endemic

Threats: Grazing

Distribution: Hlatikulu

Restricted global distribution. Cattle is a threat.

*Streptocarpus daviesii* N.E.Br. ex C.B.Clarke

Status: EN B1B2b

Endemism: Near-endemic

Threats: Urban expansion, habitat degradation

Distribution: Mbabane hills

Restricted global distribution. Known only from a single locality in Swaziland.

*Streptocarpus davyi* S.Moore

Status: VU B1B2bD2

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: 40 km around Mbabane (hills), near Mankaiana, Forbes Reef, Makhosini Hills, Makhaya

On peaty soil on granite outcrops and is fragmented. Known from a number of localities but it is not

widespread. Habitat specific in shade and soil. It is uncommon.

*Streptocarpus wilmsii* Engl.

Status: VU B1B2c

Endemism: Near-endemic

Threats: Urban expansion

Distribution: Devils Bridge, Kings Forest, Mbabane, Hilltop, Ukuthula

## HYACINTHACEAE

*Bowiea volubilis* Harv. ex Hook.f.

Status: EN A1d

Threats: Collection

Being severely depleted in Swaziland. Many extinct localities. Used for treating fractures (medicinal). Very common on market places. Known from outside Swaziland. Also heavily utilised in South Africa.

## IRIDACEAE

*Dierama elatum* N.E.Br.

Status: EX

Known only from the type collection of 1910 (Stewart 10 K & SAM). Material inadequate, and it may possibly be a hybrid or an albino form (taxonomy uncertain).

*Gladiolus brachyphyllus* F.Bolus

Status: VU A2c

Threats: Urban expansion

Distribution: Umbeluzi and Umlola Reserves, Mlawula  
Several subpopulations found in the Kruger National Park (South Africa); recorded from Limpopo Province and Mpumalanga (South Africa). Only single plants have been found in Swaziland. Very seldomly seen.

## LAMIACEAE

*Hemizygia stalmansii* Paton

Status: VU D2

Endemism: Near-endemic

Threats: Afforestation

Distribution: Luhumannei School

Recently described species known only from Sangimvelo (South Africa) and Swaziland (Malolotja). Occurs on Borberton Belt and known from different soil types, including serpentine soils. Few localities are known and it has a restricted global distribution.

*Syncolostemon comptonii* Codd

Status: CR A1cB1B2a

Endemism: Endemic

Threats: Damming

Distribution: Malolotja, Maguga

Threatened by construction of a new dam at Mogogo.

The species is known from only a single locality.

## MORACEAE

*Ficus polita* Vahl subsp. *polita*

Status: VU D2

Distribution: Mlawula (Umbeluzi Gorge, Mahlabashane), Jilobi

*Ficus sansibarica* Warb.

Status: CR B1B2cC2a

Distribution: Sihoya

## ORCHIDACEAE

*Cheirostylis gymnochiloides* (Ridl.) Rchb.f.

Status: CR B1B2cC2b

Threats: Mining

Distribution: Bomvu Ridge (Ngwenya Mountain—Malolotja)

Appears to be extremely rare everywhere. There is apparently only a single collection from Swaziland. Also known from dune forest in South Africa, and as for ofield as Tanzania and Madagascar. Flowers from August to September. Iron ore mining is a threat in Swaziland.

*Disa intermedia* H.P.Linder

Status: EN B1B2cC2a

Endemism: Endemic

Threats: Habitat degradation

Distribution: Forbes Reef, near Mbabane, Malolotja, near Oshoek

Grows at an altitude of 1,000 m. Was considered to be common at one time, but due to continued habitat destruction, it is rapidly declining. Flowers in January. Found in highveld grassland.

*Eulophia chlorantha* Schltr.

Status: EN B1B2cC2a

Endemism: Near-endemic

Distribution: Mbabane, Waverley Mine, Fonteyn

Restricted distribution.

## PROTEACEAE

*Protea comptonii* Beard

Status: EN B1B2cD

Endemism: Near-endemic?

Distribution: Bulembu, Malolotja

One outlying subpopulation in KwoZulu-Notal (South Africa), although more common in northern and northeastern parts of South Africa.

*Protea parvula* Beard

Status: VU B1B2cC2a

Distribution: Timbuti Farm, Hawane, Malolotja

Common in the former Transvaal of South Africa.

## ROSACEAE

*Prunus africana* (Hook.f.) Kalkman

Status: EN C2aD

Distribution: Near Malolotja (Forbes Reef), near and in Mbabane

Also known from South Africa (KwoZulu-Notal) and further ofield. Is widely utilised for its medicinal purposes.

## RUBIACEAE

*Gardenia thunbergia* L.f.

Status: CR C2b

Threats: Deforestation

Distribution: Jilobi Forest (Lebombo)

This species is very well represented outside Swaziland, common in coastal areas from as far ofield as the Eastern Cape in South Africa. Only a few individuals seen. Known from a small subpopulation.

*Oxyanthus pyriformis* (Hochst.) Skeels subsp. *pyriformis*

*Oxyanthus natalensis* Sond.

Status: EN B1B2cD

Endemism: Near-endemic

Distribution: Jilobi (Lebombo), Carmichael's Farm

The species is at the end of its distribution range in Swaziland, better known from KwoZulu-Notal (South Africa). The two known localities in Swaziland are quite a distance apart. Dune forest.

## SAPINDACEAE

*Allophylus chaunostachys* Gilg

Status: VU B1B2c

Endemism: Near-endemic

Threats: Urban expansion

Distribution: Makwangwa

Found at altitude 1,730 m. Reported to be common.

Human impact near border past is a threat.

## SAPOTACEAE

*Vitellariopsis dispar* (N.E.Br.) Aubrév.

Status: EN B1B2cD

Endemism: Near-endemic

Distribution: Mlawula, Siteki

Restricted. Only one locality outside Swaziland. Moist forest.

## SCROPHULARIACEAE

*Melanospermum italae* Hilliard

Status: EN B1B2cC2a

Endemism: Near-endemic

Distribution: Malalotja (Ngwenya Hills), Motjane

On sandy places around rock sheets. In South Africa, it is known from the Piet Retief area and Itala.

*Melanospermum swazicum* Hilliard

Status: EN B1B2aC2a

Endemism: Near-endemic

Threats: Fire, grazing, habitat degradation

Distribution: Mbabane, Malalotja, possibly Ngame, Siphacosi

Grows on hills. Subpopulation at Ngame may be a different species. Only one locality known outside Swaziland.

*Selago swaziensis* Rolfe

Status: EN B1B2aC2a

Endemism: Near-endemic

Threats: Urban expansion, fire

Distribution: Hills near Dalriach (Mbabane), Usuthu Forest, Miller's Falls, Makhosini Hills, Ukuthula

Known only from a single, highly threatened locality.

## ULMACEAE

*Celtis gomphophylla* Baker

Status: EN D B1 B2c C2a

Distribution: Jilobi, Carmichael's Farm, Muti Muti

More common than *Celtis mildbraedii*. Only in South Africa according to PRECIS.

*Celtis mildbraedii* Engl.

Status: CR B1B2cC2a

Distribution: Mlawula, Jilobi (east of Siteki), Forbes Reef

Very rare in South Africa's KwaZulu-Natal and elsewhere.

Known from a few small forest patches in Swaziland.

## VELLOZIACEAE

*Xerophyta villosa* (Baker) L.B.Sm. & Ayensu

Status: VU D2

Distribution: Luhumannei Schaal (Malalotja)

Found on serpentine soils in Swaziland.

## ZAMIACEAE

*Encephalartos aplanatus* Vorster

Status: EN A1acdB2abcde

Distribution: Mlawula, Goba road just north of Siteki, South of Siteki toward the farm Muti-Muti, previously on Muti-Muti

This species is also known from Mozambique. This species was described from a subpopulation of about six individuals near the Swaziland-South Africa border.

Subsequently, several subpopulations have been discovered. Threatened by illegal collectors.

*Encephalartos heenanii* R.A.Dyer

Status: CR A1acdC2a

Threats: Collection

Distribution: Ngwenya Ridge, Malalotja

In 1985, 100 plants were counted. In 1999, only 20 plants could be located. These plants are known from a locality where no recruitment seems to be taking place.

A few years ago, this species was also found in a protected area in Swaziland but in very small numbers.

Also known from South Africa. Threatened by illegal collectors.

*Encephalartos laevifolius* Stapf & Burtt Davy

Status: CR A2deB2bD

Threats: Pest/disease

Distribution: Malalotja

In Swaziland, the effects of a pathogen are evident.

Threatened by illegal collectors.

*Encephalartos lebomboensis* I.Verd.

Status: EN A1acdeA2deB1B2abcde

Threats: Harvesting, collection

Distribution: Mangana, Mbuzini, Malto Alto, Lebomba, Stataweni, Mangana

All the localities mentioned are primarily relicts.

Subpopulations suffered a measurable decline. In 1981, the subpopulation was observed to be abundant. Almost 20 years later, there has been a 25% decline.

Threatened by illegal collectors.

*Encephalartos ngoyanus* I.Verd.

Status: CR C2aD

In Swaziland, it is known from a single locality as the distribution literally tips into Swaziland. The locality is not threatened, and no people live in that area. May become threatened by illegal collectors.

*Encephalartos paucidentatus* Stapf & Burtt Davy

Status: VU A1cdC2aD2

Distribution: Makanwya, Malalotja

Found in a protected area. The species is found along the Swaziland-South African border. Also known from South Africa where it is threatened. Threatened by illegal collectors.

*Encephalartos relictus* Hurter

Status: EXW

Endemism: Endemic

Distribution: Malta Alta (10 km west), Muti-Muti farm  
It is now known only in cultivation.

*Encephalartos senticosus* Vorster

Status: VU C2aD2

Distribution: Lebamba, Usuthu, Bvane catchment

Extremely inaccessible habitat. The species is found along the Lebamba border. Threatened by illegal collectors.

*Encephalartos umbeluziensis* R.A.Dyer

Status: CR A1acdA2cB1B2abcde

Threats: Collection

Distribution: Umbeluzi Gorge of Mlawula

Occurs in the shade of *Andrastachys johnsonii* forest. This species used to be extremely common, but this has changed. The species has suffered massive decline in the last 10 years, estimated at more than 80%. It is found in an extremely accessible area. Threatened by illegal collectors.

## ZINGIBERACEAE

*Siphonochilus aethiopicus* (Schweinf.) B.L.Burtt

*Koempferia aethiopica* (Schweinf.) Benth.; *Koempferia natalensis* (J.M.Wood & Franks) Schltr. & K.Schum.

Status: EN A1d

Threats: Collection

Distribution: Malalotja, Balegane, Kamati Valley, Pigg's Peak

Generally heavily utilised everywhere. Was on the previous Swaziland RDL as Rare. The Malalotja subpopulation is well-known and utilised by local herbalists, even though it is located within a protected area. There are unconfirmed reports that several subpopulations are protected from over-utilisation through traditional laws, but this cannot be confirmed. Well-represented outside Swaziland.



*Siphonochilus aethiopicus*, also occurring in South Africa and Mozambique, is a well known species that is heavily utilised in Swaziland. (Photo: NBI)



# LOWER RISK

## ACANTHACEAE

*Thunbergia pondoensis* Lindau

Status: LR-lc

Distribution: Mlawula, Kamati Bridge

## ALOACEAE

*Aloe cooperi* Baker subsp. *pulchra* Glen & D.S.Hardy

Status: LR-lc

Threats: Grazing, alien plant infestation, harvesting  
Distribution: Lebombo, Nkambeni, Sishaweni Forest Company

Taxonomically unique and this nomenclature is used in Swaziland. Known from the Lebamba where it is rare. It is widespread. Eaten by people.

*Aloe rupestris* Baker.

Status: LR-lc

Distribution: Umbeluzi Gorge, Mnyame, Libertas, Lebamba

Was listed previously as Rare for Swaziland.

*Aloe vanbalenii* Pillans

Status: LR-lc

Distribution: Mlawula, lower East side of Umbeluzi river, Lebamba

In river valleys. Uncamman. Was listed as Rare for Swaziland in previous RDLs. Only in the northern Lebamba Mountains.

## AMARYLLIDACEAE

*Clivia miniata* (Lindl.) Regel var. *miniata*

Status: LR-nt

Distribution: Lebombo, Piggs Peak area

Forest species. Well-known from South Africa. Is being removed from the wild.

*Crinum delagoense* I.Verd.

Status: LR-lc

Threats: Agriculture

Distribution: Mlawula, Hlane (Simunye)

One subpopulation known. Only in South Africa, according to PRECIS. Sugar cultivation is a threat.

*Cyrtanthus bicolor* R.A.Dyer

Status: LR-lc

Threats: Collection

Distribution: Malalotja, Umbeluzi Valley, Mbabane (Umbeluzi Valley), Forbes Reef, Komati River Valley  
Was on the previous Swaziland RDL as Rare. Found in grassland. Eaten as a vegetable.

*Nerine angustifolia* (Baker) Baker

Status: LR-lc

Distribution: Ngwenya Mts, Farbes Reef Road, Malalotja

Recorded in Swaziland by Compton and Braun.

## ANACARDIACEAE

*Rhus grandidens* Harv. ex Engl.

Status: LR-lc

Distribution: Komati Valley, Ngamini, Mayami, Mankayane, 25 km North of Tulwane site

On forest margins. Although widespread, it is never plentiful.

## ANNONACEAE

*Uvaria lucida* Benth. subsp. *virens* (N.E.Br.)

Verdc.

Status: LR-lc

Distribution: Lebamba, Mlawula

*Xylopia odoratissima* Welw. ex Oliv.

Status: LR-lc

Distribution: Umbeluzi Gorge, Mhlumeni Border

## ANTHERICACEAE

*Chlorophytum haygarthii* J.M.Wood & M.S.Evans

Status: LR-lc

Distribution: Forbes Reef Road, Malalotja

At least two records from Swaziland by Compton and Heath. Common in Mpumalanga and KwaZulu-Natal (South Africa).

## APIACEAE

*Alepidea parva* Compton

Status: LR-lc

Threats: Collection, mining

Distribution: Ngwenya Mountains near Mbabane, Malalotja

Reported to be threatened outside Swaziland. Used for its medicinal properties.

## APOCYNACEAE

*Gonioma kamassi* E.Mey.

Status: LR-nt

Distribution: Mbabane, Msunduzi, Foot of Lubor

In forest. Common in the eastern and southern Cape forests of South Africa. Probably not used and therefore maybe not threatened. Single trees. Unusual distribution, not common in Swaziland. Frequently burnt. Very disjunct.

## ARALIACEAE

*Cussonia nicholsonii* Strey

Status: LR-lc

Distribution: Mlawula (S), Siteki

Two records, one in a protected area. Known collections in Swaziland by Culverwell and Kemp.

## ASCLEPIADACEAE

*Orbea paradoxa* (I.Verd.) L.C.Leach

*Orbeanthus paradoxa* (I.Verd.) L.C.Leach

Status: LR-nt

Threats: Mining

Distribution: Ngwenya

Listed as Endangered in South Africa's former Transvaal in previous RDLs.

*Pachycarpus galpinii* (Schltr.) N.E.Br.

Status: LR-lc

Threats: Agriculture, grazing

Distribution: Barberton Mountains, Mbabane, Usuthu, Farbes Reef, Maphaleni

This is essentially a highveld species. Cattle is a serious threat.

*Pachycymbium ubomboense* (I.Verd.) M.G.Gilbert

*Caralluma ubambaensis* I.Verd.

Status: LR-lc

Endemism: Endemic?

Distribution: Lebamba

Was listed previously as Rare for Swaziland. Is common in the Lebamba Mountains.

## ASPHODELACEAE

*Bulbine inflata* Oberm.

Status: LR-lc

Distribution: Manzini, Mbabane, Usuthu, Malalotja, Bulembu

*Gasteria batesiana* G.D.Rowley

Status: LR-nt

Threats: Collection

Distribution: Umbeluzi Gorge, Mnyami

On cliffs. Four small disjunct subpopulations in Swaziland. Collected for medicinal and horticultural purposes.

*Haworthia limifolia* Marloth var. *ubomboensis* (I.Verd.) G.G.Sm.

Status: LR-nt

Endemism: Near-endemic

Threats: Collection

Distribution: Siteki, Umbeluzi Gorge, Mnyame

In forests. Limited in distribution. Not uncamman. Known from two subpopulations in Swaziland, but restricted to the Lebombo. Known only from Iranwood forests. Collected for medicinal and horticultural purposes. Also reported from the Lebamba in South Africa and Mozambique.

## ASTERACEAE

*Eumorphia swaziensis* Compton

Status: LR-nt

Endemism: Endemic?

Threats: Urban expansion

Distribution: Mbabane District, Black Umbeluzi Valley  
Very restricted and suggested that it could be threatened. Several hundred individuals. On the edge of an urban/semi-urban environment. Should be monitored. Possibly also occurs in South Africa.

*Newtonia hildebrandtii* (Vatke) Torre

Status: LR-lc

Distribution: Mlawula, Manzimnyama (Nyame),

Umbeluzi Gorge, Black Mbeluzi River

Recorded in Swaziland by Culverwell.

*Senecio mlilwanensis* Compton

Status: LR-nt

Endemism: Endemic

Distribution: Mbeluzi Valley, Millers Falls, Mbabane and Mlilwane, Mantenga?

Rocky outcrops. In Swaziland, mostly prevalent on private land. Also found at Mantenga where it is partially protected.

## BEGONIACEAE

*Begonia sonderana* Irmsch.

Status: LR-lc

## CAPPARACEAE

*Cleome macrophylla* (Klotzsch) Briq. var. *macrophylla*

Status: LR-lc

Distribution: Mlawula (Lebombo), Mbeluzi Gorge

## COMMELINACEAE

*Aneilema dregeanum* Kunth

Status: LR-lc

Distribution: Ingwavuma Paart, Mtindekwa, Mlawula  
Three localities identified in Swaziland from collections

by Compton and Broun. Also known from South Africa, and reported also to occur in Zimbabwe.

## CRASSULACEAE

**Cotyledon orbiculata** L. var. *oblonga* (Haw.) DC.  
**Status:** LR-1c  
 Distribution: Mlawula  
 A widespread and common species (well represented outside Swaziland). The Swaziland specimen may be a misidentification (taxonomic problem). If this is a good identification, then the species has a very restricted distribution.

**Crassula acinactiformis** Schinz  
**Status:** LR-1c  
 Distribution: Ukuthula, Hlatikhulu, Komati Bridge, Mlawula, Magaga, Siteki, Umbeluzi Gorge  
 One protected locality.

**Crassula orbicularis** L.  
**Status:** LR-1c  
 Only one record for Swaziland by Kemp.

## CYATHEACEAE

**Cyathea capensis** (L.f.) Sm.  
**Status:** LR-1c  
 Limited habitat. Very well represented outside Swaziland.

## DIPSACACEAE

**Cephalaria petiolata** Compton  
*Cephalaria pungens* Szaib  
**Status:** LR-1c  
 Distribution: Malalotja, Forbes Reef Road  
 One of the four records in a protected area. The synonym is not used in Swaziland. It is common outside Swaziland.

## EBENACEAE

**Diospyros galpinii** (Hiern) De Winter  
**Status:** LR-1c  
 Distribution: Mankayane, Maphalaleni, Miller, Mantenga  
 Highveld grassland species.

## ERICACEAE

**Erica cerinthoides** L. var. *barbertonia* (Galpin) Bolus  
**Status:** LR-1c  
 Distribution: Malalotja, Waverley Mine, mHangamphepha Valley, Piggs Peak  
 Two records in Malalotja by Compton and Braun.

**Erica oatesii** Rolfe var. *latifolia* Bolus  
**Status:** LR-nt  
 Endemism: Near-endemic?  
 Distribution: Usuthu, on the road to Hlatikhulu  
 Limited distribution. Said to be rare. Possibly a taxonomic problem.

## EUPHORBIACEAE

**Croton madandensis** S.Moore  
**Status:** LR-1c  
 Distribution: Mlawula, Lebombo Mountains  
 Shrub or tree.

**Drypetes mossambicensis** Hutch.  
**Status:** LR-1c  
 Distribution: Umbeluzi Gorge (Mlawula)  
 Known only from a southern locality in Swaziland which is relatively safe. Known to occur outside Swaziland, where it is common.

**Euphorbia clavigera** N.E.Br.  
**Status:** LR-1c  
 Endemism: Endemic?  
 Threats: Grazing  
 Distribution: Manzini area, Siteki, Siphofaneni, Manzini  
 Wild-collected plants are known from cultivation. Easy to grow from seed, attractive species. Restricted distribution.

**Euphorbia grandicornis** Goebel ex N.E.Br. subsp. *grandicornis*  
**Status:** LR-1c  
 Distribution: Chindene, Big Bend  
 Very common where it occurs. Also in Ndumo, South Africa.

**Margaritaria discoidea** (Baill.) G.L.Webster  
**Status:** LR-1c  
 Distribution: Mlawula  
 Observed in the wild several times.

## FLACOURTIACEAE

**Scolopia oreophila** (Sleumer) Killick  
**Status:** LR-1c  
 Threats: Agriculture, deforestation, afforestation  
 Distribution: Manzini, Shiselweni, on Mkonzo River  
 In Swaziland, its main centre is on the Mkonzo River. Its habitat appears to be stable. The threats are not resulting in any real declines. In future lack of suitable habitat may play a role. Subsistence farming is a threat.

## GESNERIACEAE

**Streptocarpus confusus** Hilliard subsp. *lebomboensis* Hilliard & B.L.Burtt  
**Status:** LR-1c  
 Endemism: Near-endemic  
 Distribution: Mlawula, Mnyame, Jilabi  
 Scattered in moist forest of the Lebombo.

**Streptocarpus dunnii** Hook.f.  
**Status:** LR-1c  
 Distribution: Mbabane, Forbes Reef, Motjane, Gobolondo, Piggs Peak, Malalotja  
 Narrow distribution. Mainly known from the Borbertan area in South Africa. Habitat specific on granite.

**Streptocarpus micranthus** C.B.Clarke  
**Status:** LR-1c  
 Threats: Grazing, mining  
 Distribution: Kings Forest, Devils Bridge  
 Restricted distribution. The species occurs in a protected area in Swaziland. However, it does not appear in PRECIS.

## HETEROPYXIDACEAE

**Heteropyxis canescens** Oliv.  
**Status:** LR-1c  
 Distribution: Malalotja, Mbabane, Black Umbeluzi Valley, Palwane Valley  
 Was considered previously to be rare in Swaziland. Common in Malalotja.

## HYACINTHACEAE

**Drimiopsis maculata** Lindl.  
**Status:** LR-1c  
 Distribution: Mlawula, Red Tiger Ranch

**Scilla natalensis** Planch.  
**Status:** LR-nt  
 Threats: Collection  
 Distribution: Malalotja, Usuthu, Mbabane  
 Widespread. Suggested to be classified as Vulnerable. Widely used and still abundant. In remote places it is frequent. Collected for medicinal purposes.

## IRIDACEAE

**Dierama mobile** Hilliard  
**Status:** LR-nt  
 Threats: Habitat degradation  
 Distribution: Oshoek, 15 km North of Forbes Reef, Komati River, Malandzela  
 Found in Swaziland and South Africa. Fairly widespread. Wetland species.

**Diets flavida** Oberm.  
**Status:** LR-1c  
 Distribution: Malalotja and Mlawula Reserves, Lebombo  
 Has a disjunct distribution and scarce everywhere.

**Watsonia bella** N.E.Br. ex Goldblatt  
**Status:** LR-1c  
 Threats: Grazing, fire  
 Distribution: Malalotja, Hlatikhulu, Forbes Reef, Mbabane, 5 km NE of Motjane, Malalotja  
 In Swaziland, grazing by cattle is a threat. Common in South Africa.

## LAMIACEAE

**Acrotome thorncroftii** Skan  
**Status:** LR-1c  
 Distribution: Mlawula, Lomahasha, Tulwana, Blue Jay Ranch  
 Previously listed as rare. Known from about five herbarium collections in Swaziland.

**Hemizygia albiflora** (N.E.Br.) M.Ashby  
**Status:** LR-1c  
 Distribution: Ngwenya Mountains  
 Known from collections in Swaziland by Compton and Dlamini.

**Hemizygia modesta** Codd  
**Status:** LR-1c  
 Distribution: Bomvu Ridge, Havelock, Gege, Forbes Reef  
 Recorded in Swaziland by Compton.

**Orthosiphon vernalis** Codd  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: Manzini, Mankaiana, Bhunya area, Evelyn Biring Bridge

**Synclostemon concinnus** N.E.Br.  
**Status:** LR-1c  
 Distribution: Malalotja, Mankayane, Hlatikhulu

**Thorncroftia longiflora** N.E.Br.  
**Status:** LR-1c  
 Endemism: Near-endemic  
 Distribution: Malalotja  
 Common in Malalotja.

**Tinnea barbata** Vollesen  
**Status:** LR-1c  
 Distribution: Wyldesdale, Malalotja  
 Recorded in Swaziland by Compton, Heath and Braun.

**Tinnea galpinii** Briq.  
**Status:** LR-1c  
 Distribution: Hlatikhulu, Mlawula, Siteki, Cecil Marks Pass  
 Recorded in Swaziland by Compton and Culverwell.

## LEGUMINOSAE: PAPILIONOIDEAE

**Cordyla africana** Lour.  
**Status:** LR-1c  
 Very rare and marginal in Swaziland, often occurring as single plants. It is a widespread tropical plant. Wild Monga.



**Eriosema ellipticifolium** Schinz  
**Status: LR-lc**  
 Distribution: Malolotja, Malandzela, Mbabane  
*One record in Swaziland by Heath.*

**Eriosema transvaalense** C.H.Stirt.  
**Status: LR-nt**  
 Threats: Damming  
 Distribution: Malolotja, Maguga  
*Has a globally restricted distribution.*

**Tephrosia cordata** Hutch. & Burtt Davy  
**Status: LR-lc**  
 Distribution: Malalotja, Havelock, Mbabane

**Tephrosia gobensis** Brummitt  
**Status: LR-lc**  
 Endemism: Endemic ?  
 Distribution: Mlawula, Siteki

**Tephrosia grandiflora** (Aiton) Pers.  
**Status: LR-lc**  
 Distribution: Blue Jay Ranch (Mlawula), Mananga Mount, Siteki  
*Recorded in Swaziland by Campton.*

**Tephrosia kraussiana** Meisn.  
**Status: LR-lc**  
 Distribution: Mlawula  
*Known from collections in Swaziland by Culverwell.*

## LOBELIACEAE

**Cyphia bolusii** E.Phillips  
**Status: LR-lc**  
 Distribution: Mbabane (3 paps), Dalrich, Mbabane, Emlembe, Malkerns  
*On serpentine soils.*

**Lobelia corniculata** Thulin  
**Status: LR-lc**  
 Distribution: Lebamba, Siteki, Mlawula  
*Was listed as Indeterminate/Uncertain in previous RDLs. Known from very few herbarium collections.*

## LYTHRACEAE

**Nesaea alata** Immelman  
**Status: LR-lc**  
 Distribution: Mlawula  
*In or near shallow ponds. Only recorded twice, once from Kruger National Park (South Africa) and once in the Lebamba Mountains.*

## MORACEAE

**Ficus bubu** Warb.  
**Status: LR-lc**  
 Distribution: Mlawula, Manzinyama, Umbeluzi Paart, Siteki, Sihaya  
*In Androstachys forests in Mlawula.*

## OLEACEAE

**Chionanthus foveolatus** (E.Mey.) Stearn subsp. *foveolatus*  
**Status: LR-lc**  
 Distribution: Mlawula, Jilabi, Umbeluzi Gorge  
*Known from only a single protected locality in Swaziland.*

## ORCHIDACEAE

**Disa extintoria** Rchb.f.  
**Status: LR-nt**  
 Distribution: Unspecified locality in Swaziland  
*Rare, occurs in damp grassland and swamps at an altitude of 1,000–1,300 m. Flowers from December to*

*January. Also known from the former Transvaal in South Africa. Its status in previous RDLs is Indeterminate.*

**Disa stachyoides** Rchb.f.  
*Monadenia leydenburgensis* Kraenzl.  
**Status: LR-lc**  
 Distribution: Mlembe, Malalotja  
*Widespread in many parts of South Africa. Also reported in Lesotho.*

**Polystachya albenscens** Ridl. subsp. *imbricata* (Rolfe) Summerh.  
**Status: LR-nt**  
 Threats: Afforestation, grazing  
 Distribution: Gabhala  
*Recently found in southern KwaZulu-Natal forests of South Africa. A sewerage plant in Swaziland may pose a threat.*

**Polystachya zuluensis** L.Bolus  
**Status: LR-nt**  
 Endemism: Near-endemic  
 Distribution: Usuthu Forest, Mzimba Mnts., Mbabane North  
*In rocky highveld areas, abundant, an Xerophyte. Locally common.*

**Schizochilus cecilii** Rolfe subsp. *culveri* (Schltr.) H.P.Linder  
**Status: LR-nt**  
 Endemism: Near-endemic  
 Distribution: NW Swaziland, Malolotja  
*Confined to the mountains between Barberton (South Africa) and northwestern Swaziland. Flowers from December to January.*

## POACEAE

**Aristida transvaalensis** Henrard  
**Status: LR-lc**  
 Distribution: Malalotja, Malandzela, Miamba, Farbes Reef  
*Three records in a protected area by Braun. Widespread in South Africa.*

**Ehrharta erecta** Lam. var. *erecta*  
**Status: LR-lc**  
 Distribution: Malalotja  
*Taxonomy needs attention.*

**Eragrostis comptonii** De Winter  
**Status: LR-lc**  
 Endemism: Endemic  
 Distribution: Mbabane area, Malalotja  
*Occurs in shady places at foot of rocks or forest margins. Very similar to Eragrostis curvula.*



**Mondia whitei**, also known from South Africa and Mozambique, is used for medicinal purposes. (Photo: A. Nicholas)

## POLYGALACEAE

**Heterosamara galpinii** (Hook.f.) Paiva  
*Polygala galpinii* Hook.f.  
**Status: LR-lc**  
 Distribution: Devils Bridge, Kings Forest (Bulembu)  
*In South Africa, it has been categorised as Rare and even Endangered in previous RDLs. Occurs in unprotected small localities.*

## PROTEACEAE

**Leucospermum gerrardii** Stapf  
**Status: LR-lc**  
 Distribution: Malalotja (and surroundings)  
*Fairly common in Mpumalanga (South Africa). Locally common, but restricted distribution. Subpopulation stable. Can survive fires. Habitat specific, saproxytic.*

## PSILOTACEAE

**Psilotum nudum** (L.) P.Beauv.  
**Status: LR-lc**  
 Distribution: Umbeluzi Gorge, Malalotja, Mlawula  
*A cosmopolitan species, but seldom common anywhere. Widespread in Africa, Madagascar, Mauritius, Australia, Palynesia, Spain, the Americas and so forth.*

## RUBIACEAE

**Pavetta barbertonensis** Bremek.  
**Status: LR-lc**  
 Distribution: Siteki, Kings Forest, Lebomba Mnts., Palata, Mlawula  
*Was on the previous Swaziland RDL as Rare.*

## SAPOTACEAE

**Manilkara colorata** (Harv. ex C.H.Wright) Gerstner  
**Status: LR-lc**  
 Distribution: Bulunga Paart, Mlawula, Siteki, Umbeluzi, Timbutini, Manzini  
*Recorded in Swaziland by Campton, Culverwell and Kemp.*

**Manilkara discolor** (Sond.) J.H.Hemsl.  
**Status: LR-lc**  
 Distribution: Mlawula, Carmichael's, Mzimfopo River  
*Only in South Africa according to PRECIS, but observed by several people in the wild in Swaziland.*

## ACANTHACEAE

*Barleria oxyphylla* Lindau

Status: DD

Endemism: Near-endemic?

Threats: Agriculture

Distribution: Tshaneni (Lowveld)

Known only from type collection (1970s) in Komotipoort (South Africa). However, unconfirmed reports that it occurs in Swaziland, as well as Mozambique. Restricted distribution range.

*Peristrophe transvaalensis* (C.B. Clarke) K. Balkwill

Status: DD

Distribution: Ingwavuma Poort, Hlane Game Reserve

*Salpinctum hirsutum* T.J. Edwards

Status: DD

Threats: Agriculture, urban expansion

Distribution: Siteki, Hlatikulu, Malandze Road to Maphalaleni

Very little is known about this recently described species.

## ALOACEAE

*Aloe chortolirioides* A. Berger var. *woolliana* (Pole-Evans) Glen & D.S. Hardy

Status: DD

Distribution: Malalotja, Forbes Reef, Mbabane, the Umbeluzi (near Waterford), Hawane Waterfall

The yellow form is found across the border in South Africa. The yellow form is more widely distributed than the red form. Generally known from Limpopo Province and Mpumalanga in South Africa.

*Aloe cooperi* Baker subsp. *cooperi*

Status: DD

Distribution: Malolotja Valley, Ezulwini, Stegi, 20 km North of Pigg's Peak

Found in Malolotja Valley in the mid-veld. Taxonomic problem makes this species difficult to assess. Very common and widespread in South Africa.

*Aloe dominella* Reynolds

Status: DD

Distribution: Ingwavuma (Southern part)

Was listed as Indeterminate for Swaziland in a previous RDL. No further information available but thought prudent to include it here.

*Aloe greatheadii* Schonland var. *davyana* (Schonland) Glen & D.S. Hardy

*Aloe graciliflora* Groenew.; *Aloe barbertoniae* Pole-Evans

Status: DD

Some of the above taxa were previously considered to be threatened in the former Transvaal (South Africa). Extremely common and widespread in South Africa.

*Aloe integra* Reynolds

Status: DD

Threats: Afforestation

Distribution: Malalotja, Usuthu Forests, 3 km east of Mankanyane

Was previously thought to be Rore in Swaziland. Usuthu Forest subpopulation is healthy with well over 500 individuals. Is a forestry conservation site. Identified as area worthy of protection.

## AMARYLLIDACEAE

*Clivia caulescens* R.A. Dyer

Status: DD

Threats: Collection

Distribution: Devils Bridge

Two records for it in Swaziland. Collected for horticultural purposes.

*Clivia miniata* (Lindl.) Regel var. *citrina* Watson

*Clivia miniata* (Lindl.) Regel var. *flava* E. Phillips

Status: DD

Endemism: Near-endemic?

*Clivia nobilis* Lindl.

Status: DD

No herbarium specimen for Swaziland, but has been observed there.

## ANACARDIACEAE

*Lannea schweinfurthii* (Engl.) Engl. var.

*stuhlmannii* (Engl.) Kokwaro

Status: DD

Likely to be extinct in Swaziland.

*Rhus rogersii* Schonland

Status: DD

Known from Lydenburg to between Nelspruit and Borberton (South Africa).

## ANNONACEAE

*Xylopia parviflora* (A. Rich.) Benth.

Status: DD

Threats: Collection

Collected for medicinal properties.

## ANTHERICACEAE

*Chlorophytum acutum* (C.H. Wright) Nardal

Status: DD

Single record by Compton. PRECIS does not have it recorded for Swaziland.

*Chlorophytum saundersiae* (Baker) Nardal

Status: DD

Distribution: Lebombo Mountains

In Swaziland, known mainly from records by Compton. Common in Eastern Cape and KwaZulu-Natal (South Africa).

## ARALIACEAE

*Cussonia zuluensis* Strey

Status: DD

Distribution: Bulunga Poort, Sipophaneni, Sidvokodvo

One record in Swaziland by Compton.

## ASCLEPIADACEAE

*Asclepias crassinervis* N.E. Br.

Status: DD

Distribution: Mbabane, Usuthu Forest, Komati Pass, Maphalaleni

Reported to occur in Swaziland.

*Asclepias cultriformis* Harv. ex Schltr.

Status: DD

Distribution: Usuthu, 14 km from Pigg's Peak to Mbabane, unspecified locality in Mbabane

Widespread, although represented by only a few collections.

*Brachystelma chlorozonum* E.A. Bruce

Status: DD

Distribution: Ingwavuma

Was previously considered to be Rore in South Africa's former Transvaal, but new subpopulations have been found along the escarpment in Swaziland.

*Brachystelma circinatum* E. Mey.

Status: DD

Known from Codd 9515.

*Brachystelma gemmeum* R.A. Dyer

Status: DD

Taxonomy of the Swaziland specimens may possibly need attention. The species was previously reported to only occur in South Africa. Known only from a single record in Swaziland.

*Brachystelma gerrardii* Harv.

Status: DD

Distribution: Black Umbeluzi Valley, Nkomati Pass, Little Usuthu River, Sipocosini, Komati Pass

Recorded in Swaziland by Compton.

*Ceropegia ampliata* E. Mey.

Status: DD

Distribution: Ngwenya Causeway

Known from collections in Swaziland by Boyliss.

*Ceropegia carnosa* E. Mey.

Status: DD

Distribution: Komati Pass, Bunya

Known from collections in Swaziland by Kemp.

*Ceropegia crassifolia* Schltr.

Status: DD

Distribution: Dinedor

Known from collections in Swaziland by Culverwell and Wallis.

*Ceropegia decidua* E.A. Bruce subsp. *decidua*

Status: DD

Distribution: Sicusha, Mtindekwa River

One record for Swaziland by Compton.

*Ceropegia fortuita* R.A. Dyer

Status: DD

Distribution: Ngwenya Causeway

In 1976 one site according to Compton. Only occurs in South Africa according to PRECIS.

*Ceropegia linearis* E. Mey. subsp. *woodii* (Schltr.)

H. Huber

Status: DD

Distribution: Malagwane Hill, Siphofaneni, Mdimba

Recorded in Swaziland by Codd, Dlamini, Culverwell and Kemp.

*Ceropegia nilotica* Kotschy

*Ceropegia plicata* E.A. Bruce

Status: DD

Distribution: Ingwavuma Poort

Known mainly from old collections (Compton).

*Ceropegia pachystelma* Schltr.

Status: DD

Distribution: Sicusha

Known mainly from old collections (Boyliss).

*Ceropegia racemosa* N.E. Br. subsp. *setifera*

(Schltr.) H. Huber

Status: DD

Distribution: Mlawula, Maguga, Gollel, Komati Pass

One site protected, whereas the other is inundated. It is known from several collections such as those of Culverwell, Germishuizen, Dlamini and Hilliard.

*Ceropegia rendallii* N.E. Br.

Status: DD

Known from collections in Swaziland by Boyliss.

*Ceropegia sandersonii* Decne. ex Hook.f.

Status: DD

Distribution: Sicusha, Ngwenya Causeway, Dinedor,

Mtindekwa River, Maloma

The species is well-collected by Compton.



**Woodia singularis N.E.Br.**  
**Status:** DD  
Endemism: Near-endemic  
Reported as o Swaziland endemic, although there is an old record from o neighbouring locality in South Africa.

## ASPHODELACEAE

**Haworthia limifolia Marloth var. limifolia**  
**Status:** DD  
Threats: Collection  
Distribution: Lebombo (Siteki to Pongola)  
Collected for medicinal purposes. Also in Mpumalanga and KwaZulu-Natal (South Africa).

**Trachyandra asperata Kunth subsp. swaziensis Oberm.**  
**Status:** DD  
Distribution: Ukuthula, Black Umbeluzi Falls, Mbabane  
Recorded in Swaziland by Compton.

## ASTERACEAE

**Helichrysum argyrolepis MacOwan**  
**Status:** DD  
Distribution: Malolotja, Ukuthula, Usuthu, Mbabane, Ngwenya Mountains, Devils Bridge  
Recorded in Swaziland by Compton and Broun. Common in Mpumalanga and KwaZulu-Natal (South Africa).

**Helichrysum atrixifolium (Kuntze)**  
**Status:** DD  
Distribution: Malkerns, Mlawula, Hlatikulu, Hlane Game Reserve, Malandzela, possibly Maguga

**Helichrysum aureolum Hilliard**  
**Status:** DD  
Distribution: Forbes Reef, Hlambanyati Valley, Mbabane  
One record in Swaziland by Dlomini. Several records for it in Mpumalanga and KwaZulu-Natal (South Africa).

**Helichrysum aureum (Houtt.) Merr. var. candidum Hilliard**  
**Status:** DD  
Distribution: Forbes Reef, Mbabane, Gobolo  
Known from several varieties in Swaziland. Helichrysum aureum var. aureum was collected by Compton in the Lebombo. H. aureum var. monocephalum was collected by Broun in Molotja. Swaziland seems to be on ecotone for varieties of this species.

**Helichrysum chrysargyrum Moeser**  
**Status:** DD  
Distribution: Black Mbeluzi Valley, Ukuthula, Mbabane, Ngoyoyo  
Recorded in Swaziland by Compton. Several records for it in Mpumalanga and KwaZulu-Natal (South Africa).

**Helichrysum dasyanthum (Willd.) Sweet**  
**Status:** DD  
Only one herbarium record for it in Swaziland by Stewort. Generally known from the Cope in South Africa.

**Helichrysum difficile Hilliard**  
**Status:** DD  
Distribution: Forbes Reef  
Known from collections in Swaziland by Compton. Common in Gouteng and Mpumalanga (South Africa).

**Helichrysum galpinii N.E.Br.**  
**Status:** DD  
Distribution: Waverly Mine, Ngwenya Mountains, Motjane, Mbabane, Bomvu Ridge  
Recorded in Swaziland by Compton. Fairly common in Mpumalanga (South Africa).

**Helichrysum mimetes S.Moore**  
**Status:** DD  
Distribution: Ukuthula, Mbabane, Black Mbeluzi Falls, Havelock

Recorded in Swaziland by Compton. Known from several records in Mpumalanga (South Africa).

**Helichrysum mixtum (Kuntze) Moeser var. grandiceps Hilliard**  
**Status:** DD  
Distribution: Ngundwane River, Malandela, Bremmersdorp, Komati Bridge, Kobolando Mountain.  
Recorded in Swaziland by Compton.

**Helichrysum mutabile Hilliard**  
**Status:** DD  
Distribution: Evelyn Baring Bridge, Komati Pass  
Both records in Swaziland by Compton.

**Helichrysum petraeum Hilliard**  
**Status:** DD  
Distribution: Millers Falls, Palwane Hills  
One record in Swaziland by Compton. Known from several records in KwaZulu-Natal (South Africa).

**Helichrysum reflexum N.E.Br.**  
**Status:** DD  
Distribution: Havelock Road, Bomvu Ridge  
Record in Swaziland by Compton. Known from several records in Mpumalanga (South Africa).

**Helichrysum tongense Hilliard**  
**Status:** DD  
Distribution: Mpepo  
Reported to be rare in South Africa. No information available for Swaziland.

**Helichrysum transmontanum Hilliard**  
**Status:** DD  
Distribution: Malolotja, Mhlambanyatsi Valley, Black Mbeluzi Valley, Emlembe  
Recorded in Swaziland by Compton and Broun.

**Helichrysum truncatum Burt Davy**  
**Status:** DD  
Distribution: Palwane Hills  
Known from collections in Swaziland by Compton. Known from several records in Mpumalanga (South Africa).

**Helichrysum wilmsii Moeser**  
**Status:** DD  
Distribution: Black Mbeluzi Falls, Piggs Peak, Devils Bridge, Emlembe  
Recorded in Swaziland by Compton.

**Inula paniculata (Klatt) Burt Davy**  
**Status:** DD

**Plecostachys polifolia (Thunb.) Hilliard & B.L.Burt**  
**Status:** DD  
Distribution: Havelock  
Known from collections in Swaziland by Miller.

**Senecio mbuluzensis Compton**  
**Status:** DD  
Distribution: 5 km West of Mhlosheni, Ukuthula, Mbabane, Black Umbeluzi Valley  
Widespread. Possibly o near-endemic but information unavoiuble. Reported to be rare in South Africa. No information available for Swaziland.

**Senecio medley-woodii Hutch.**  
**Status:** DD  
Distribution: Lebombo Mountains (Jozini) to Umtamvuna River, Mlawula  
Hos succulent stems. Good horticultural potential. Reported to be foirly uncommon in South Africa. No information available for Swaziland.

**Senecio umbellatus L.**  
**Status:** DD  
Widespread in Swaziland. Generally known from the Cope flora in South Africa.

## CELASTRACEAE

**Allocassine laurifolia (Harv.) N.Robson**  
**Status:** DD  
Distribution: Jilobi Forest, Mbeluzi Gorge -Shewula  
Known from collections in Swaziland by Kemp.

## COLCHICACEAE

**Sandersonia aurantiaca Hook.**  
**Status:** DD  
Threats: Collection  
Distribution: Hlatikhulu  
Rare everywhere and often removed and picked by flower collectors. Also known from os for ofield as the Cope in South Africa.

## COMMELINACEAE

**Aneilema schlechteri K.Schum.**  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Malinda, Grand Valley  
Known from collections in Swaziland by Codd, from two localities.

## CRASSULACEAE

**Crassula alba Forssk. var. pallida Toelken**  
**Status:** DD  
Endemism: Endemic?  
Distribution: Bomvu Ridge, Mukusini Hills, Nyokane  
Recorded from Swaziland by Compton and Dlomini.

**Crassula alba Forssk. var. parvisepala (Schonland) Toelken**  
**Status:** DD  
Distribution: Malolotja, Maguga, Ngenya Hills, Siteki, Bearded man Mountain.  
Known mainly from three records, one in o protected areo. Two are possibly in on inundated areo.

**Crassula compacta Schonland**  
**Status:** DD  
Distribution: Bomvu Ridge  
Known from collections by Compton and Forsyth-Thompson.

**Kalanchoe alticola Compton**  
**Status:** DD  
Distribution: Mukusini Hills

**Kalanchoe luciae Raym.-Hamet subsp. montana (Compton) Toelken**  
**Status:** DD  
Endemism: Near-endemic  
Distribution: Devils Bridge, Mbabane, Hilltop  
Recorded in Swaziland by Compton and Dlomini.

**Kalanchoe sexangularis N.E.Br.**  
*Kalanchoe ragersii* Raym.-Hamet  
**Status:** DD  
Threats: Grazing  
Distribution: Ingwavuma Poort (Lebombo)  
Habitot specialist, but with o scottered distribution. Cattle grazing is o threat.

## CYPERACEAE

**Costularia natalensis C.B.Clarke**  
*Tetralia natalensis* (C.B.Clarke) Koyama  
**Status:** DD  
Threats: Afforestation  
Distribution: Usuthu Forest, Dalriach, Ukuthula, Piggs Peak  
Found in grossland and forest morgins. In KwaZulu-Natal (South Africa), it is threatened by offorestation. The commonly used genus nome is Tetralia. Common in

KwoZulu-Notal, Mpumolongo and Limpopo Province (South Africa).

**Schoenoxiphium lehmannii (Nees) Steud.**

*Kabresia lehmannii* (Nees) Koyama var. *lehmannii*

Status: DD

Threats: Urban expansion, collection

Distribution: Malolotja, Hilltop

The synonym was listed as threatened in previous RDLs. Hilltop site near an informal settlement where it is highly threatened. Used for basketry. Very common in South Africa.

## DRYOPTERIDACEAE

**Polystichum macleanae (Baker) Diels**

Status: DD

Fairly common in South Africa's Mpumolongo and Limpopo Province.

**Polystichum transkeiense Jacobsen**

Status: DD

Distribution: Kings Forest

Known from collections in Swaziland by Burrows.

## EBENACEAE

**Euclea undulata Thunb.**

Status: DD

Distribution: Simunye, Sicusha, Golela

Only one record for Swaziland by Rodin.

## ERICACEAE

**Erica revoluta (Bolus) L.E.Davidson**

*Erica austraverna* Hilliard

Status: DD

No known herbarium specimens for Swaziland, but observed there in the wild.

## EUPHORBIACEAE

**Croton steenkampianus Gerstner**

Status: DD

Distribution: Blue Jay Ranch (Mlawula)

One record in a protected area by Lycette. Known to be extremely common outside Swaziland.

**Euphorbia knobellii Letty**

Status: DD

Swaziland specimens should be checked and taxonomy needs attention.

**Synadenium cupulare (Boiss.) L.C.Wheeler**

Status: DD

Distribution: Mdheshana farm

Recorded in Swaziland by Miller.

## GENTIANACEAE

**Sebaea erosa Schinz**

Status: DD

Distribution: Mbabane

Known from collections in Swaziland by Camptan.

## GESNERIACEAE

**Streptocarpus cyaneus S.Moore**

Status: DD

Distribution: Millers Falls, Mmhlambanyati, Piggs Peak, Malkerns, Malolotja

**Streptocarpus pentherianus Fritsch**

Status: DD

Threats: Urban expansion

Distribution: Mbabane, Hawane Falls

Restricted distribution. Does not appear in PRECIS.

**Streptocarpus polyanthus Hook. subsp. comptonii (Mansf.) Hilliard**

Status: DD

## HIPPOCRATEACEAE

**Salacia gerrardii Harv.**

Status: DD

Distribution: Jilabi, Muti-muti

Only in South Africa according to PRECIS.

## HYACINTHACEAE

**Drimiopsis maxima Baker**

Status: DD

Distribution: Usuthu Mission

**Ornithogalum capillare J.M.Wood & M.S.Evans**

Status: DD

Known from many localities in South Africa. The distribution tips into Swaziland.

**Ornithogalum monophyllum Baker**

Status: DD

Distribution: Nduma, Mbabane (Fanteyn), Havelock

Recorded in Swaziland by Camptan, Dlomini and Kemp.

**Ornithogalum saundersiae Baker**

Status: DD

Distribution: Marula Ridge, Mbabane, Cecil Mancks Pass

Recorded in Swaziland by Compton and Nicholson.

## HYPOXIDACEAE

**Hypoxis hemerocallidea Fisch. & C.A.Mey.**

Status: DD

Very widely used. Still very widespread and abundant in the wild.

## IRIDACEAE

**Dierama adelphicum Hilliard**

Status: DD

Distribution: Unspecified locality in Swaziland

Known from Limpopo Province and Mpumolonga (South Africa).

**Dierama insigne N.E.Br.**

Status: DD

Distribution: Oshaek

Common in South Africa.

**Dierama medium N.E.Br.**

Status: DD

Distribution: Usuthu, Waverley Mine

Common in South Africa.

**Dierama mossii (N.E.Br.) Hilliard**

Status: DD

Distribution: Forbes Reef

Known from several collections from Forbes Reef.

Common in South Africa.

**Gladiolus ferrugineus Goldblatt & J.C.Manning**

*Gladiolus varius* F.Bolus var. *micranthus* (Baker) Oberm.

Status: DD

Distribution: Forbes Reef, 4.5 km West of Piggs Peak

Common in South Africa.

**Gladiolus hollandii L.Bolus**

Status: DD

Previously listed as Rare for South Africa's former Transvaal and Swaziland. It is reported to be common in hills above Borbertan in South Africa, as it is a highveld species. Common in South Africa.

**Hesperantha umbricola Goldblatt**

Status: DD

Endemism: Endemic?

Threats: Habitat degradation

Distribution: Mbabane hills

Apparently there are closely related specimens from southern KwoZulu-Natal (South Africa).

## LAMIACEAE

**Hemizygia petiolata M.Ashby**

Status: DD

Distribution: Maguga, Sisa

**Hemizygia pretoriae (Gürke) M.Ashby subsp. heterotricha Codd**

Status: DD

Distribution: Hlatikhulu, Verdun, Kubuta, Gege

Recorded in Swaziland by Camptan.

**Hemizygia pretoriae (Gürke) M.Ashby subsp. pretoriae**

Status: DD

Distribution: Ngatshane

Known from collections by Camptan.

**Hemizygia transvaalensis (Schltr.) M.Ashby**

Status: DD

Distribution: Malolotja, Piggs Peak

One record for Swaziland requiring confirmation.

**Plectranthus rubropunctatus Codd**

Status: DD

Distribution: Mzimba, Forbes Reef, Ermela Rd., Piggs Peak, Mbabane

**Plectranthus zuluensis T.Cooke**

Status: DD

Endemism: Near-endemic

Distribution: Mzimba, Umbeluzi

Recorded in Swaziland by Culverwell.

**Stachys aethiopica L.**

Status: DD

Distribution: Isiteki Beacon

Known mainly from old collections (Compton).

**Stachys arachnoidea Codd**

Status: DD

Distribution: Mbabane District, Malolotja, Piggs Peak, Forbes Reef

**Stachys natalensis Hochst. var. galpinii (Briq.) Codd**

Status: DD

Distribution: Malolotja, Havelock mine, Nduma, Ngwenya Mountain.

**Stachys simplex Schltr.**

Status: DD

Distribution: Malolotja, Mbabane

**Stachys tubulosa MacOwan**

Status: DD

Only in South Africa according to PRECIS. However, certain that it occurs in Swaziland, but never surveyed.

**Thorncroftia thorncroftii (S.Moore) Codd**

Status: DD

Endemism: Near-endemic

Distribution: Northwest of Piggs Peak (mountains) Found at a neighbouring locality in South Africa.

## LAURACEAE

**Ocotea kenyensis (Chiov.) Robyns & R.Wilczek**

Status: DD

Distribution: Kings Forest (Bulembu), Malolotja



LEGUMINOSAE: CAESALPINIOIDEAE

*Chamaecrista capensis* (Thunb.) E.Mey. var. *capensis*  
Status: DD  
Distribution: Hawane Falls  
Known from collections by Camptan and Stewart.

*Chamaecrista capensis* (Thunb.) E.Mey. var. *flavescens* (Thunb.) E.Mey.  
Status: DD  
Distribution: Strama  
Known from collections in Swaziland by Compton.

LEGUMINOSAE: PAPILIONOIDEAE

*Tephrosia albissima* H.M.L.Forbes subsp. *albissima*  
Status: DD  
Distribution: Mankayane  
Known from collections in Swaziland by Compton.

*Tephrosia brummittii* Schrire  
Status: DD  
Endemism: Endemic? -  
Distribution: Black Umbeluzi Falls, Malandzela  
Recorded in Swaziland by Camptan and Germishuizen.

*Tephrosia capensis* (Jacq.) Pers. var. *capensis*  
Status: DD  
Known mainly from old collections (Magg).

*Tephrosia natalensis* H.M.L.Forbes subsp. *natalensis*  
Status: DD  
Distribution: Evelyn Baring Bridge, Tshaneni, Mankaiana  
Recorded in Swaziland by Campton.

*Tephrosia retusa* Burtt Davy  
Status: DD  
Only in South Africa according to PRECIS. However, certain that it occurs in Swaziland, but never surveyed.

LOBELIACEAE

*Monopsis malvacea* E.Wimm.  
*Labelia caddii* Compton  
Status: DD  
Endemism: Endemic  
Distribution: Mbabane, Hlatikulu

LORANTHACEAE

*Tapinanthus forbesii* (Sprague) Wiens  
Status: DD  
Distribution: Tshaneni

*Tapinanthus gracilis* Toelken & Wiens  
Status: DD  
Distribution: Ingwavuma Poort  
Known from collections in Swaziland by Campton and Dlamini.

*Tapinanthus rubromarginatus* (Engl.) Danser  
Moeser  
Status: DD  
Distribution: Hlatikhulu, Mankaiana, Tshaneni  
Three records by Campton, Dlamini and Karsten.

LYTHRACEAE

*Nesaea sagittifolia* (Sond.) Koehne var. *ericiformis* Koehne forma *swaziensis* Immelman  
Status: DD  
Basically known from four records by Campton and Karsten.

*Nesaea zambatidis* Immelman  
Status: DD  
Distribution: Mlawula  
Known from collections in Swaziland by Culverwell.

MARSILEACEAE

*Marsilea fenestrata* Launert  
Status: DD  
Locally common in seasonally inundated pans.

MELIACEAE

*Turraea floribunda* Hochst.  
Status: DD  
Distribution: Lebomba Mountains, Mhlaphé, Siteki  
Recorded in Swaziland by Compton.

MELIANTHACEAE

*Bersama transvaalensis* Turrill  
Status: DD  
Known from two records in Swaziland by Dlamini. From a South African perspective, unlikely to be rare.

MORACEAE

*Ficus burtt-davyi* Hutch.  
Status: DD  
Distribution: Shiselweni Forest Company  
Known from two subpopulations in Swaziland.

OCHNACEAE

*Ochna arborea* Burch. ex DC. var. *oconnorii* (E.Phillips) Du Toit  
Status: DD  
Distribution: Muti Muti, Jilobi, north of Mbabane  
Unconfirmed report that it occurs in Swaziland.

*Ochna gamostigmata* Du Toit  
Status: DD  
Distribution: Havelock Concession

OLEACEAE

*Olea woodiana* Knobl.  
Status: DD  
Distribution: Jilobi, Ubamba Mountain.  
Recorded in Swaziland by Miller.

OLINIACEAE

*Olinia emarginata* Burtt Davy  
Status: DD  
Distribution: Jilobi  
Previously reported only to occur in South Africa.

ORCHIDACEAE

*Calanthe sylvatica* (Thouars) Lindl.  
*Calanthe natalensis* (Rchb.f.) Rchb.f.  
Status: DD  
Distribution: Malandela  
In evergreen and riverine montane forest, near streams and swampy areas. Also known from the Eastern Cape in South Africa. Widespread throughout Tropical Africa and Madagascar.

*Eulophia speciosa* (R.Br. ex Lindl.) Bolus  
*Eulophia austroaaccidentalis* Sälth.; *Eulophia leucantha* (Kraenzl.) Sälth.  
Status: DD  
Distribution: Mlawula, Umbeluzi Gorge  
Northwards into Tropical Africa. Also reported from the

Cape area (South Africa). Bath synonyms were classified as threatened in previous RDLs.

*Habenaria bicolor* Conrath & Kraenzl.  
*Habenaria laevigata* Lindl. subsp. *bicolor* (Conrath & Kraenzl.) Schltr.  
Status: DD  
Known mainly from Gauteng (South Africa). Flowers mainly from March to April. According to PRECIS, two localities outside Swaziland. Apparently new specimens collected from Swaziland. Reported from Zimbabwe but very unlikely. Known from grasslands.

*Habenaria culveri* Schltr.  
Status: DD

*Neobolusia tysonii* (Bolus) Schltr.  
Status: DD  
Distribution: Farbes Reef  
Wide distribution in South Africa from the Eastern Cape to Mpumalanga. Small cross-border distribution in Swaziland.

PASSIFLORACEAE

*Adenia hastata* (Harv.) Schinz var. *glandulifera* W.J.de Wilde  
Status: DD  
Distribution: Bulunga Poort  
Single record by Campton.

PERIPLOCACEAE

*Mondia whitei* (Hook.f.) Skeels  
Status: DD  
Threats: Collection  
Distribution: Siteki, Ubamba  
Widespread, and probably utilised everywhere. Known from several collections in Swaziland. Harvested for medicinal purposes. Nothing is known about the rates of utilisation in Swaziland, and distributions from herbarium collections in Swaziland could not be confirmed.

POACEAE

*Ehrharta erecta* Lam. var. *natalensis* Stapf  
Status: DD  
Distribution: Malalotja  
Known from collections in Swaziland by Braun. Widespread in the summer rainfall region of South Africa.

*Eragrostis barbinodis* Hack.  
Status: DD  
Endemism: Near-endemic  
Distribution: Nkomati River Valley  
Also known from South Africa.

*Sartidia jucunda* (Schweick.) De Winter  
Status: DD  
Endemism: Near-endemic  
Distribution: Malalotja  
The species is restricted to the Barberton Mountains. Known from only a single site outside Swaziland.

*Sartidia* sp.  
Status: DD  
Endemism: Near-endemic  
Distribution: Malalotja (N & S)  
Found on serpentine soils, but undescribed for more than a decade.

*Thamnocalamus tessellatus* (Nees) Sonderstr. & R.P.Ellis  
*Arundinaria tessellata* (Nees) Munro  
Status: DD  
Dispute as to how abundant this species is in Swaziland. Well represented outside Swaziland. Utilised throughout its range.

## PROTEACEAE

*Faurea macnaughtonii* E.Phillips

Status: DD

Distribution: Mlumat, Malotja, Shelangubu Valley  
Locally common, but restricted distribution in Swaziland.

## RHIZOPHORACEAE

*Cassipourea swaziensis* Compton

Status: DD

Endemism: Near-endemic

Threats: Grazing, fire

Distribution: Mhlosheni, 2 km north of Mbabane, Nhlanguano, Nsongweni

Very restricted in Swaziland. Also in South Africa (KwaZulu-Natal, Mpumalanga?). Quortzite. Area poorly collected, only old collections. Cattle grazing and population growth o problem.

## RUBIACEAE

*Canthium suberosum* Codd

Status: DD

Distribution: Hlatikhulu

Known from specimens collected by Compton.

*Pavetta zeyheri* Sond.

*Pavetta micralansea*-K.Schum.

Status: DD

The synonym was listed as threatened in previous RDLs. Known only from old collections.

*Pentas micrantha* Baker subsp. *wyliei* (N.E.Br.) Verdc.

Status: DD

Distribution: Mapokane, Mnyame, Komati Valley, Tulwane

## RUTACEAE

*Teclea gerrardii* I.Verd.

Status: DD

Distribution: Muti Muti, Jilobi

Recorded in Swaziland by Miller.

*Teclea natalensis* (Sond.) Engl.

Status: DD

*Teclea pilosa* (Engl.) I.Verd.

Status: DD

## SAMYDACEAE

*Homalium dentatum* (Harv.) Warb.

Status: DD

Distribution: Jilobi, Siteki, Tibulati stream

Recorded in Swaziland by Miller.

## SANTALACEAE

*Thesium gracilentum* N.E.Br.

Status: DD

Distribution: Emlembo Mountain (Havelock Concession)

Found in on inaccessible habitat.

## STERCULIACEAE

*Crassula greenwayi* Brenan

Status: DD

Distribution: Shewula (Umbeluzi Gorge North Bank), Muti Muti

*Sterculia murex* Hemsl.

Status: DD

Only in South Africa according to PRECIS. However, certain that it occurs in Swaziland but never surveyed.

## TURNERACEAE

*Triliceras laceratum* (Oberm.) Oberm.

Status: DD

Distribution: Tshaneni

Known from collections in Swaziland by Edwards and Culverwell.

*Triliceras longipedunculatum* (Mast.) R.Fern. var. *longipedunculatum*

Status: DD

Known mainly from old collections (Barrett).

## VERBENACEAE

*Vitex rehmannii* Gürke

Status: DD

Distribution: Siteki

Known from collections in Swaziland by Miller.



*Encephalartos relictus* is classified as *Extinct in the Wild*. (Photo: P.J.H. Hurter)



# Zambia



Mike G. Bingham\* & Paul P. Smith†

## Introduction

The Zambian flora is characterised by extensive areas of relatively undisturbed habitat, well-defined areas of local endemism, very restricted montane areas, and a high proportion of wetlands (Fanshawe 1963–1973, 1971, White 1968).

The most extensive vegetation type in Zambia is miombo woodland, dominated by the caesalpinoid genera *Brachystegia*, *Julbernardia*, and *Isoberlinia*. Miombo woodland is also widespread in the Democratic Republic of Congo (DRC), Malawi, and Tanzania. Large areas of miombo woodland in Zambia remain relatively undisturbed.

This is the first comprehensive Red Data List (RDL) treatment of the Zambian flora and is based mainly on the endemic plants of Zambia. Zambia shares most of its areas of endemism with neighbouring countries, and it is likely that when these border areas become better known, many of the species

listed as endemics in this chapter will be found to be near-endemics.

The main centres of endemism in Zambia are:

- The Zambezi source area in Mwinilunga District, shared with Angola and the DRC
- The Bangweulu Basin, shared with the DRC
- The Mweru–Tanganyika Basin, including the Itigi Thicket area, shared with Katanga (in the DRC) and Tanzania
- The mid-Zambezi Valley, shared with Zimbabwe
- The montane areas, shared with Malawi and Tanzania

The first four of these centres belong to the Zambezian Regional Centre of Endemism (White 1983); the last belongs to the East African Montane system, which consists of a broken chain of mountains, associated with the East African Rift, extending from the Arabian Peninsula to the Drakensberg of South Africa.



Mwinilunga grassland–forest interface. (Photo: J. Burrows)

\*Woodlands, Lusaka, Zambia

†Royal Botanic Gardens Kew, Wakehurst Place, England

**Capital:** Lusaka, largest city

**Area:** 752,614 km<sup>2</sup>

**Languages:** English (official), Bemba, Lozi, Nyanja, Tonga

**Currency:** Zambian kwacha (ZK)

**Total plant species:** 4,747

**Total plant endemics:** 201

**Total RDL plants:** 505

**Focal RDL institution:** PRE, K

**Number of Protected Areas:** 19 National Parks, 35 Game Management Areas and other formal and informal protected areas.

**Population:** 9,881,210 **Growth Rate:** 2.2% **Density:** 12.7 people/km<sup>2</sup>

**Phytogeography:** Zambezian, with a small area of Afromontane in the northeast.

**Flora:** Miombo woodland, with drier mopane woodland in the Luangwa and Zambezi Valleys and parts of the west on Kalahari sands. Patches of lowland forest in the northwest, and montane forest and grassland in the northeast.

**Sources:** Anonymous 2000, Fanshawe 1969, Stuart & Adams 1990

**Table 1. Correspondence between *Flora zambesiaca* geographical divisions (Pope & Pope 1998) and current provincial divisions.**

Flora zambesiaca geographical divisions	Current provincial divisions
Barotseland (B)	Western Province and part of North-Western Province
Northern Region (N)	Northern Province and Luapula Province
Western Region (W)	Copperbelt Province and North-Western Province (except western part, which is in <i>Flora zambesiaca</i> Barotseland)
Central Region (C)	Lusaka Province and part of Central Province (except the western part, Mumbwa, which is in <i>Flora zambesiaca</i> Southern Region)
Eastern Region (E)	Eastern Province
Southern Region (S)	Southern Province and part of Central Province (western part)

**Methods**

The first stage in the RDL compilation process was a SABONET workshop held in Lusaka, Zambia (15–21 June 2000). The workshop participants were initially trained to apply the methodology of the IUCN (1994) system of assessing conservation status. Thereafter, a draft national RDL was produced and was circulated for revision by specialists with taxonomic expertise and botanical knowledge of the Zambian flora.

*Sources of Data*

The two primary data sources for the compilation of Zambia’s RDL were a checklist sourced from the IUCN Threatened Plants Committee (TPC) (1981), and *Flora zambesiaca* (1960–present).

The IUCN TPC checklist is unpublished and was obtained from the Herbarium of the Division of Forest Research (NDO) in Kitwe, where it was still being used as a working document. The checklist is biased towards the better-known, high profile species.

**Table 2. Results of the RDL assessments for Zambia.**

Category	Number of taxa
Critically Endangered (CR)	3
Endangered (EN)	7
Vulnerable (VU)	136
Lower-Risk near threatened (LR-nt)	30
Lower-Risk least concern (LR-lc)	84
Data Deficient (DD)	245
Total on RDL	505
Endemics, suspected endemics, and near endemics with RDL assessment	329
Threatened endemics, suspected endemics, and near endemics (CR, EN, VU)	85

*Flora zambesiaca*, our second source, is approximately 60% complete. The compilers of the RDL nevertheless had access to unpublished *Flora zambesiaca* manuscripts for the Poaceae, Fabaceae, and Rubiaceae, which increased the taxonomic coverage to around 70% of Zambia’s flora.

Additional sources of information were Frank White’s *Forest Flora of Northern Rhodesia* (1962) and taxonomic revisions published in various journals. For several families for which published data were unavailable or deficient, assistance was sought from specialist taxonomists at K (Royal Botanic Gardens, Kew, England) and PRE (National Herbarium, Pretoria, South Africa). Otherwise, there was no direct input from any herbaria and the significant collections amassed over the past decade by the local herbaria, even when they had been reliably identified, hardly featured.

Global Red Lists compiled by the IUCN (Walter & Gillett 1998) and WCMC (Oldfield *et al.* 1998) were also consulted and Zambian species that appear on these lists were subsequently re-evaluated. The gazetteer by Pope & Pope (1998), which makes use of *Flora zambesiaca* geographical divisions, assisted in the process of estimating measures of distribution range (*Extent of Occurrence* and *Area of Occupancy*).

*Working Assumptions*

Assessments were conducted by making various assumptions and inferences. Factors such as the conspicuous nature of the plant, proximity to human settlements, and proximity to main access routes, were used in the assessment process on a species-by-species basis. For example, the assumption was made that the more conspicuous the plant, the more likely that it would have been collected by botanists and hence reflected in the number of herbarium collections; likewise, the habitats of plants are more likely to be degraded if they occur

close to human settlements or along main access routes. Occurrence of species in habitats known to be threatened was also a consideration.

A second set of factors that was taken into account was the probable distribution range of the species. For example, it was assumed that plants are probably widely distributed if the herbarium records reflect disjunct populations within the same plant habitat.

The VU D2 Category (*Vulnerable*) was assigned in cases where a plant was known only from its type locality or known to be of limited distribution. Species known only from the type collection were assigned *Data Deficient* status where locality or collection data were ambiguous.

**Results and Discussion**

*The Red Data List*

A total of 505 species are listed on the RDL for Zambia, out of a total flora of about 5,000 species (Table 2). Of these, 146 were assessed as threatened (*Critically Endangered* (CR), *Endangered* (EN) and *Vulnerable* (VU)), but as almost half of the total number of species assessed (245) were rated as *Data Deficient* (DD), many changes in future status may be anticipated. The majority of species designated as DD have too few or ambiguous collection details, whereas many others have uncertain taxonomy (see Golding & Smith 2001). The vast majority of Zambian species on the global RDLs compiled by IUCN (Walter & Gillett 1998) and WCMC (Oldfield *et al.* 1998) were evaluated and subsequently excluded from this RDL.

While compiling the Zambian RDL, we were constrained by the lack of a national plant checklist and by incomplete data—when national checklists are available and endemics are noted, these form a basis for



**Table 3. The ten families with the highest representation on the Zambian RDL.**

Family	Number of taxa
Leguminosae	58
Orchidaceae	55
Euphorbiaceae	50
Rubiaceae	46
Cyperaceae	34
Poaceae	33
Asteraceae	20
Scrophulariaceae	20
Gentianaceae	11
Hypoxidaceae	10

systematically compiling an RDL. For example, a high number of endemic sedges (Cyperaceae) may be expected in a country such as Zambia, where wetlands account for 30–40% of the surface area (Fanshawe 1971). Yet, the number of sedges represented on the RDL is not as high as expected. This is probably due to gaps in our current knowledge—to date no comprehensive taxonomic treatments have been published for the Cyperaceae. The same holds for the Acanthaceae, Lamiaceae, and most of the petaloid monocotyledonous families. Even amongst those families that have been published in *Flora zambesiaca*, there are many with species described from single collections or only from the type locality in Zambia. The status of such species will not be fully understood until more fieldwork is done and the collected plant material reviewed.

As more fieldwork is carried out and new species are discovered and described, the number of species in the threatened categories will probably increase. On the other hand, as more information about known species becomes available, many species currently designated VU D2 or DD are likely to shift status or be removed from the list.

### Endemics

As with most countries in the Zambezian Regional Centre of Endemism (White 1983), Zambia has relatively few endemics (201 confirmed endemics; 128 suspected or near-endemics) for a country of its size (about 735,000 km<sup>2</sup>). The list of endemics presented here is much higher than previously published.

The majority of Zambian endemics belong to the largest plant families worldwide (Mabberley 1987; see Table 3), in sharp



***Elaphoglossum zambesianum* from the source of the Zambezi River. (Photo: J. Burrows)**

contrast to the winter-rainfall areas of South Africa and southwestern Australia, where recent speciation has produced large numbers of endemic or near-endemic taxa at the supra-specific level (genera and families) (Cowling & Hilton-Taylor 1994). This is because recent speciation in the Zambezian Region is possibly not as prevalent as in many other regions, and suggests a stable environment in which competition for essential nutrients amongst established species is sufficiently vigorous to exclude invaders or suppress variation. The opportunities for rapid speciation, particularly of annuals, appear to be limited in tropical Africa.

### Threats to Plant Species in Zambia

The major threats to plant species in Zambia are:

- Habitat loss through human settlements, urbanisation, cultivation, overgrazing, exploitative range management and engineering projects
- Non-sustainable utilisation of species
- Alien plant infestations

Perhaps the most sensitive area in Zambia is the Ikelenge “Pedicel” in the northwestern corner of Mwinilunga District. This area, which includes the source of the Zambezi River, is the richest in species and in local endemism (Bingham 1994). It is also relatively densely populated. The growth of the city of Lusaka alone has accounted for the destruction of a significant area of miombo woodland. More serious, however, is the threat to the flora of the carbonate outcrops to the west of Lusaka City, which are the only known habitat of *Euphorbia*

*debilisipina* and probably also other species.

Deforestation for woodfuel has occurred extensively along railway lines; in addition the plant habitats associated with the more important waterbodies used for fishing (for example, the northern lakes and the Luapula Valley) have become degraded (Bingham 1998). Although felled but uncultivated miombo woodland areas can rapidly regenerate, degradation of more sensitive habitats is irreversible.

Threatened habitats in Zambia include the following:

- Riparian forest—clearing for cultivation, especially in the Ikelenge “Pedicel” (Zambezi Source area) of Mwinilunga District
- Itigi Thicket in Northern and Luapula Provinces—settlement and cultivation
- Mateshi evergreen thicket in Northern and Luapula Provinces—cultivation and fires
- Livunda *Cryptosepalum* forest in northwestern Zambia—over-exploitation and cultivation
- *Baikiaea* forest in Western Province—over-exploitation, cultivation and fires
- The Kafue Flats—changes in the flood-

**Table 4. Endemism on the Zambian RDL.**

Endemism	Number of taxa
Confirmed endemic	201
Suspected endemic	84
Confirmed near-endemic	17
Suspected near-endemic	27
<b>TOTAL</b>	<b>329</b>



*Disa walleri*, *Habenaria holubii*, and *Brachychorythis pleistophylla*, all possibly used for *chikanda*.  
(Photos: G. Williamson)

ing regime necessitated by hydropower generation

- The Lusaka dolomites—urban expansion and quarrying

Invasive alien plants of Australian origin, such as *Acacia* species and proteaceous trees and shrubs, that are major invaders in the subtropical areas of southern Africa, are not a problem in Zambia, and most are difficult to grow. The most serious invaders in Zambia are from tropical South America and India. They include *Lantana camara*, *Psidium gnajava*, *Toona ciliata*, and *Solanum hispidum*. Probably the most successful alien is the herb *Ageratum conyzoides*, although it is unlikely to have displaced any indigenous species. *Solanum mauritianum* (“Bugweed”) and *Chromolaena odorata* (“Triffid Weed”) both occur in disturbed places, but are effectively controlled by periodic droughts.

#### Important Utilised Species

Not all utilised species in Zambia have been placed on this RDL. All utilised species should, however, be monitored, as they may in future be good candidates for RDLs if they are not utilised sustainably. The export trade in indigenous hardwood timbers employs large numbers of people in harvesting and marketing, but there is far too little effective control (Campbell 1996).

*Daniellia alsteeniana* is the only species known to have been exploited commercially that also has a very limited known distribution in the country. This species is known in Zambia only from the northern

half of Luapula and Northern Provinces; recent accounts state that it has been extensively depleted and that many sites have been extirpated, particularly in Mporokoso District.

Zambezi teak (*Baikiaea plurijuga*), which was Zambia’s major export before copper and tobacco came into prominence, is rapidly becoming depleted. Many of the most productive teak forest areas are now totally destroyed by repeated harvesting of progressively smaller logs, as well as destructive fires.

The most important indigenous timber for export and domestic use is mukwa (*Pterocarpus angolensis*). It has some measure of protection in vast areas that have no ready access, but areas of intensive extraction are being expanded continually. Since the tree is never dominant in Zambia, the extraction of timber does not seriously affect the environment, although there is likely to be a long-term decline in the timber quality of the tree.

*Guibourtia coleosperma*, sold mostly to South Africa as rosewood, is currently being exploited in considerable quantities. Fortunately, it is more fire-tolerant than most woodland species and populations are not likely to be seriously affected.

The exploitation of *Dalbergia melanoxylon* (African ebony), the wood used for making clarinets and oboes, is a cause for concern in East African countries. Although fairly common in the drier parts of Zambia, the tree rarely achieves a size large

enough to sustain a viable industry, although it is much used in carvings.

Many other species are exploited for woodcarvings, drums, stools, pestles and mortars, bridges, huts and other temporary structures (Campbell 1996). Trees suitable for dugout canoes are no longer found near the major sources of fish. On the Kafue Flats, the species now most commonly exploited is the palm *Borassus aethiopicum*, which takes at least 25 years to mature.

Several sources of fibre for weaving are exploited for domestic use, as well as for crafts for the tourist trade (Campbell 1996). These include the following:

- The bast fibre of several trees, used for ropes and string
- The palms *Calamus deeratns* (rattan), *Hyphaene petersiana*, and *Raphia farinifera*
- The roots of the tree *Combretum zeyheri* (mukenge)
- *Cyperus papyrus* (papyrus)
- *Oxytenanthera abyssinica* (bamboo)

No comprehensive RDL assessments of the status of these plants have been undertaken, because information on the rates of utilisation and their distribution was unavailable. The three palms all need to be monitored—excessive harvesting of the leaves prevents the plants from reaching maturity. Since palms provide habitats for a number of animal species, the elimination of mature trees from extensive areas restricts the habitat of these animals. The greatly increased demand for the edible tubers of orchids belonging to the gen-



era *Disa*, *Satyrium*, *Habenaria*, *Brachycorythis*, and probably others for making a product called *chikanda* or “African polony” has seen the depletion of these orchids over much of Zambia and Malawi (Bingham & Kokwe 2001, Golding 2001, Ng’uni *et al.* 2001). In fact, much of the product being sold on urban Zambian markets is imported from Angola and Tanzania.

Of similar concern is the unsustainable harvesting of “African potato”, the bulbs of several *Hypoxis* species sold as a cure for many ailments, including HIV/AIDS, throughout the region.

## Conclusion

All of Zambia’s local centres of endemism have been relatively well-collected in the past by notable collectors such as Richards, Astle, White, Fanshawe, Robinson, and Milne-Redhead. However, botanists have neglected most of these areas for the past 40 or 50 years. There is therefore an urgent need to reassess these centres and the many endemic species they contain.

In compiling the Zambian RDL, we were constrained by the lack of a good botanical library in the country, and, in particular, by the virtually dormant state of local herbaria. Curation has been minimal since the early 1970s and during the 1980s little or no fumigation was carried out in any of the herbaria, resulting in catastrophic losses.

More work is required before this RDL can be said to truly reflect the conservation status of Zambia’s flora. Input is urgently needed from systematic specialists, particularly to reduce the number of DD species on the list. In addition, more cooperation from specialists within southern Africa—ecologists, foresters, and conservationists—and people with knowledge of other relevant disciplines—ethnobotanists, anthropologists, and so forth—is required.

Outdated species data were also a major limitation in the compilation of this RDL. As better data become available, the RDL presented here should be refined to give a more accurate reflection of Zambia’s threatened flora.

The value of this first comprehensive plant RDL for Zambia is that it will form the basis of subsequent lists, and is something for everyone to work with. We hope that the conservation and scientific communities will rise to this challenge, and freely contribute their knowledge towards updating this list throughout its many future iterations.

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The area of Zambezi Rapids is rich in flora but under-studied. (Photo: J. Burrows)



# EXTINCT & THREATENED

## AMARANTHACEAE

*Celosia richardsiae* C.C.Towns.

Status: VU D2

Endemism: Endemic?

Distribution: North

Type is from Mweru Wontipa. Known from a steep area near moisture. Collected at an altitude of 1,000 m.

## ANNONACEAE

*Uvaria edulis* N.Robson

Status: VU D2

Distribution: West

Type from Zombezi River north of Kaleni Hill Mission. Possibly known only from the type.

## APIACEAE

*Aframmi longiradiatum* (H.Wolff) Cannon

Status: VU D2

Endemism: Near-endemic?

Distribution: North

Type from DRC.

*Frommia ceratophylloides* H.Wolff

Status: VU D2

Distribution: East

High montane endemic. Very characteristic looking plant. Stands 1 m tall.

## APOCYNACEAE

*Adenium multiflorum* Klotzsch

Status: VU D1D2

Occurs northwards to East Africa. Sometimes varietal status is used, but this is not the case in Zambia.

*Strophanthus emini* Aschers. & Pax

Status: VU D2

Distribution: North

Endemic to the Itigi thicket. Type is from Tanzania. Has very large conspicuous leaves.

## ARALIACEAE

*Schefflera abyssinica* (Hochst. ex A.Rich.) Harms

Status: VU D2

Distribution: North

Habitat is near waterfall sprays. It is an epiphyte occurring in small localities. Species has the potential to be exploited because it is a popular horticultural plant. Well-represented in East Africa.

## ASPHODELACEAE

*Aloe excelsa* Berger

Status: VU D2

Distribution: South

Only one disjunct locality in Zambia (from a rocky gorge), but widespread in Zimbabwe. Well-represented outside Zambia.

## ASTERACEAE

*Ageratinastrum palustre* Wild & G.V.Pope

Status: VU D2

Endemism: Endemic?

Distribution: North

Swampy or dombu areas with tall grasses. Altitude of 1,350 m. Type from Ndunda Swamp, Mbala. Cannot

confirm whether it occurs in Tanzania. Possibly known only from the type.

*Erythrocephalum albiflorum* Wild

Status: VU D2

Endemism: Endemic?

Distribution: West

In Brachystegia and mixed deciduous woodland. Type is from Solwezi. Known only from western Zambia and possibly from Malawi. Very conspicuous. Is an erect suffrutescent.

*Gutenbergia mweroensis* Wild & G.V.Pope

Status: VU D2

Endemism: Endemic

Distribution: North

In a sandy area on the lake foreshore in swampy and rocky places.

*Gutenbergia spermacoceoides* Wild

Status: VU D2

Distribution: North

Type is from Mungwi (Kasama District). Sandy soils often in pan-like depressions. Known only from the northern region of Zambia. One specimen from western Tanzania in the same habitat.

*Gutenbergia trifolia* Wild & G.V.Pope

Status: VU D2

Endemism: Endemic

Distribution: West

Collected in shallow peaty soil near a waterhole. Known only from the type.

*Pleiotaxis oxylepis* Jeffrey

Status: VU D2

Endemism: Near-endemic

Distribution: North

Miamba woodland often on steep slopes. Type is from Kalamba Falls, collected there twice. Also known from Tanzania. Narrow distribution range.

*Vernonia isoetifolia* Wild

Status: VU D2

Endemism: Endemic

Distribution: North

Moist sandy grassland. Type from Kombole-Mbolo Road. Known only from around Mbolo.

*Vernonia mutimushii* Wild

Status: VU D2

Endemism: Endemic

Distribution: North

Slightly moist dombos. Type is from Manchele.

*Vernonia najas* Wild

Status: VU D2

Endemism: Endemic?

Distribution: West

Sandy watershed grassland. Type from Mwinilunga, 18 km east of Kaleni Hill. Possibly known only from Zambia.

*Vernonia zambiana* G.V.Pope

Status: VU D2

Endemism: Endemic?

Distribution: North

Brachystegia woodland often in sandy soil. Type from Chishimba Falls in Kosama District. Possibly a Zambian endemic.

## BORAGINACEAE

*Cystostemon hispidissimus* (S.Moore) Miller &

Riedl subsp. *zambiensis* Miller & Riedl

Status: VU D2

Endemism: Endemic

Distribution: West

Grows in Brachystegia woodland and edges of dry Brachystegia boehmii margins.

## CAMPANULACEAE

*Wahlenbergia ramossima* (Hemsl.) Thulin subsp. *richardsiae* Thulin

Status: VU D2

Endemism: Endemic

Distribution: North

Damp grassland or sandy soil. Type from Mbolo by Richards.

## CAPPARACEAE

*Maerua paniculata* Wild

Status: VU B1B2C2D2

Distribution: North

Type is from Itigi thicket, Chishelo Chikuku.

## COLCHICACEAE

*Gloriosa sessiliflora* Nardal & Bingham

Status: VU D2

Endemism: Endemic?

Distribution: Barotseland

Known from a single population at the type locality. Many individuals are reported to be known from this locality. Found on floodplain termite mounds and sandbanks with riverine forest. Difficult to find, under Syzygium forest. Apparently also a site photo from Namibia, presumably from Coprivi, in the linear dune systems of the Kalahari dunes. Found on elevated parts of the Bolazi Plain.

## COMBRETACEAE

*Combretum mweroense* Baker

Status: VU D2

Endemism: Near-endemic?

Distribution: North

Semi-deciduous thicket in Chipyo thicket (degraded Itigi that has been burnt). Scrambler in scrub. Possibly occurs in Tanzania and DRC.

*Meiostemon tetrandrus* (Exell) Exell & Stace subsp. *australis* Exell

Status: VU B1B2C

Distribution: South

Dense, low altitude deciduous thicket where Acacia is dominant. In Zambia, known from game ranches and National Parks where it is said to be threatened by elephants. Also recorded from Mozambique and Zimbabwe.

*Meiostemon tetrandrus* (Exell) Exell & Stace subsp. *tetrandrus*

Status: VU B1B2C

Distribution: North

In Itigi thicket, probably as widespread as Itigi thicket. Shallow sand covering granite. Extremely leached and infertile sands. Type is from Allon in Mweru Antipio. Apparently also recorded in East Africa.

## CONNARACEAE

*Burtia prunoides* Baker f. & Exell

Status: VU B1B2C

Endemism: Near-endemic?

Distribution: North

An endemic to Itigi thicket in northern Zambia.



## CONVOLVULACEAE

*Ipomoea richardsiae* Verdc.

Status: VU D2

Endemism: Endemic

Distribution: West

In woodland on rock outcrops. Altitude of 1,200–1,300 m. Type is from Kolenda Village in Mwinilunga. Apparently not known from elsewhere.

## CUCURBITACEAE

*Cucumis humifructus* Stent

Status: VU D2

Distribution: North, Barotseland

In swamp forests but also reported on Kalahari sands which needs verification.

## EUPHORBIACEAE

*Clusia whytei* Hutch. var. *monticoloides* Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: North

Known only from this area. Higher rainfall plateau grassland.

*Croton scheffleri* Pax

Status: VU D2

Distribution: North

*Euphorbia debilisipina* L.C.Leach

Status: EN B1B2C

Endemism: Endemic

Distribution: Central

Known only from limestone outcrops (small area of endemism). Quarrying and urban expansion have resulted in habitat loss.

*Euphorbia distinctissima* L.C.Leach

Status: VU D2

Endemism: Endemic

Distribution: North

*Euphorbia fanshawei* L.C.Leach

Status: VU

Endemism: Endemic

Distribution: North

Reported to be rare.

*Euphorbia perplexa* L.C.Leach var. *kasamana*

L.C.Leach

Status: VU D2

Endemism: Endemic?

Distribution: North

*Euphorbia speciosa* L.C.Leach

Status: VU D2

Endemism: Endemic

Distribution: North

*Jatropha seineri* Pax var. *tomentella* Radcl.-Sm.

Status: EN B1B2C

Endemism: Endemic

Distribution: Central, South

Soils derived from carbonate rocks.

*Monadenium discoideum* Bally

Status: VU D2

Source: IUCN TPC (1981).

*Monadenium filiforme* (Bally) S.Carter var. *filiforme*

Status: VU D2

Distribution: North

Source: IUCN TPC (1981).

*Monadenium friesii* N.E.Br.

Status: VU B1B2c

Endemism: Endemic

Distribution: Central

Miamba woodland, very inconspicuous, easily overlooked. Occurs in a variety of habitats. Also on limestone areas not likely to be cultivated. Is endemic to a small area in Lusaka and Chisamba, where it is fairly common (60 km north of Lusaka).

*Monadenium hirsutum* Bally

Status: VU D2

In miamba woodland.

*Monadenium pseudoracemosum* Bally var. *lorifolium* Bally

Status: VU D2

Source: IUCN TPC (1981).

*Monadenium pudibundum* Bally var. *pudibundum* Bally

*Monadenium simplex* Pax var. *pudibundum* (P.R.O.Bally)

P.R.O.Bally

Status: VU D2

Endemism: Endemic

Distribution: West

Type from Mwinilunga.

*Tragia micromeres* Radcl.-Sm.

Status: VU

Distribution: North

Disturbed by human settlements. Type from Lake Bangweulu on fixed dunes.

*Tragia prostrata* Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: North

Known only from the type locality. Higher rainfall miamba, chipya and tall grassland.

*Tragiella friesiana* (Prain) Pax & Hoffm.

Status: VU D2

Endemism: Endemic

Distribution: North

Type from Mparakasa. Higher rainfall miamba woodland.

## FABACEAE

*Aeschynomene lateriticola* Verdc.

Status: VU D2

Endemism: Endemic

Distribution: West

Known only from the type in Mwinilunga (collected in 1938 by Milne-Redhead). Is a perennial prostrate herb. Found in open grassland, overlying lateritic soil.

*Aeschynomene stipulosa* Verdc.

Status: VU D2

Endemism: Endemic

Distribution: West

Is a perennial prostrate herb, known only from the type locality in Mwinilunga (on a river bank), collected by Milne-Redhead (1937). Brachystegia woodland species. Possibly known only from the type.

*Aeschynomene venulosa* Verdc. var. *grandis* Verdc.

Status: VU D2

Endemism: Endemic

Distribution: North

Known only from Mbala from two specimens. Both were collected by Richards along a 200 m gradient, at different times. Woodland and short grassland species.

*Azelia bipindensis* Harms

Status: VU D2

Distribution: West

Apparently known only from one locality in Zombio (Mwinilunga). Widespread in West Africa. Commonly used as a timber tree.

*Aphanocalyx trapnellii* (J.Léonard) Wieringa

Status: VU D2

Endemism: Endemic

Distribution: North

Known only from one small area. It is a medium-sized tree

that forms almost monospecific stands. Is used in the building industry.

*Baikiea plurijuga* Harms

Status: VU A1acd

Wide distribution but threatened due to heavy logging of the species.

*Baphia speciosa* Gillett & Brumm.

Status: VU D2

Endemism: Endemic

Distribution: North

Conspicuous 7 m tall tree. It is thick with a mass of grassland and scrub.

*Bussea massaiensis* (Taub.) Harms subsp. *rhodesica* Brenan

Status: VU B1B2c

Endemism: Near-endemic?

An endemic to Itigi thicket in northern Zambia.

*Crotalaria criniramea* Bakerf. ex Polhill

Status: VU D2

Endemism: Endemic

Distribution: West

From a well-collected area. Altitude 1,300–1,500 m

*Crotalaria simoma* Polhill

Status: VU D2

Endemism: Endemic?

Distribution: North

It was collected twice at the same locality. This is not a well-collected species.

*Crotalaria trinervia* Polhill

Status: VU D2

Endemism: Endemic

Distribution: North, West

First collected in Mwinilunga, a well-collected area. Brachystegia woodland.

*Dalbergia melanoxylon* Guill. & Perr.

Status: VU A1d

Distribution: Central/East

Widespread in Zambia. Unhealthy populations in Luangwa. Also recorded from Angola, Botswana, Central African Republic, DRC, Ethiopia, Kenya, Malawi, Mozambique, Namibia and others.

*Daniellia alsteeniana* Duvin.

Status: EN A1acd

Distribution: North

Grows in dry evergreen forest and high quality miamba woodland (deep soil miamba woodland). Used for canoes. Large numbers are being cut down in Mparakasa. Many sites have been extirpated.

*Droogmansia pteropus* (Baker) De Wild. var. *axillaris* Verdc.

Status: VU D2

Endemism: Endemic

Distribution: North

It is recorded from two collections in Mbala (two localities in close proximity to each other). Species grows in grassland and open dambas.

*Humularia kapiensis* (De Wild.) Duvin. var. *repens* Verdc.

Status: VU D2

Endemism: Endemic

Distribution: West

Collected twice in Mwinilunga in 1960 (Robinson) and 1969 (Tronche). A conspicuous plant although it is prostrate. The habitat is dry, sandy plateau grassland at 1,500 m.

*Humularia minima* (Hutch) Duvin. subsp. *flabelliformis* (Duvin.) Verdc.

Status: VU D2

Endemism: Endemic

Distribution: North

Known only from the type locality, was never recorded there again despite the area being fairly well-collected. It could be that it is very rare.

**Humularia minima (Hutch) Duvign. subsp. minima**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: North, West  
 Collected by Milne-Redhead (1930s). Found in Mbala (collected by Burt in 1936). Mainly Brachystegia woodland in Kalahari sand.

**Humularia pseudoeschymene Verdc.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: West  
 Well-collected area. Watershed grassland on Kalahari sand.

**Indigofera emarginella Steud. ex A.Rich. var. langeifolia Gillett**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: North  
 Type is from Mbala. Open woodland or bush amongst grass.

**Katschya africana Endl. var. latifolia Verdc.**  
**Status: VU D2**  
 Endemism: Near-endemic  
 Distribution: East  
 Type is from near the top of Kagampande Mountain. Grows up to 6 m tall. Conspicuously glandular and sticky. Also known from Molowi.

**Katschya longiloba Verdc.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: North  
 The type was collected in 1950. Habitat is floodplains in wet black soils.

**Katschya suberifera Verdc.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: West  
 Known only from Kaleni Hill which has been well-collected. The species has been described as being dominant over a small area. Shrub of 2 m.

**Ophrestia breviracemasa Verdc.**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: West  
 In Uapaca woodland at altitude of 1,500 m. Known only from the collection of Drummond & Williamson 9307 (1969).

**Pseudoprasapis fischeri (Taub.) Harms**  
**Status: VU B1B2c**  
 Endemism: Endemic?  
 Distribution: North  
 Itigi thicket endemic. An important constituent in dense thicket. Altitude of 760–1,000 m. Habitat under threat. Not known whether it is endemic to Zambia.

**Tephrosia kasikiensis Bakerf. subsp. chinsaliana Brummitt**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: North  
 Specimen was collected along a shady riverine habitat. The type is from Shiwo Ngandu.

**Vigna comasa Baker subsp. abercarnensis Verdc.**  
**Status: VU D2**  
 Endemism: Endemic?  
 Distribution: North  
 In rocky places, altitude 1,200–2,000 m. Type from Mbolo on the path to the Inono Source (collected by Richards). Narrow distribution range.

## GENTIANACEAE

**Canscra kirkii N.E.Br.**  
**Status: VU D2**

Endemism: Near-endemic  
 Distribution: South  
 Edges of rainforest and at the end of the spray zone of waterfalls. The type collection is from an island in Victoria Falls, between Zambia and Zimbabwe. It is known to be uncommon.

**Faraa carniculata P.Taylor**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: North  
 Rock crevices at altitude of about 1,500 m.

**Sebaea perpusilla Paiva & Nogueira**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Barotseland, West  
 Collected in a wet dambo. Type from Sinkabola Dambo in Mwinilunga. Possibly known only from the type.

## HYPOXIDACEAE

**Curculigo multiflora Zimudzi**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: West  
 This species is known only from the type locality. It is larger than Hypoxis.

**Hypoxis dregei (Baker) Nel.**  
**Status: VU A2cd**  
 Endemism: Near-endemic?  
 Distribution: North, West  
 Wide distribution.

**Hypoxis fischeri Pax**  
**Status: EN A2cd**  
 Endemism: Endemic?  
 Distribution: West  
 Sandy open places and miombo woodland.

**Hypoxis gaetzei Harms**  
**Status: EN A2cd**  
 Distribution: East, West, Central  
 Plateau woodland and dambo margins.

**Hypoxis iridifolia Baker**  
**Status: VU A2cd**  
 Endemism: Endemic?  
 Distribution: Barotseland, Central, West  
 Habitat is sandplain and miombo woodland.

**Hypoxis villasa L.f.**  
**Status: VU A2cd**  
 Distribution: Central, Barotseland, North

## IRIDACEAE

**Gladiolus serenjensis Goldblatt**  
**Status: VU D2**  
 Endemism: Endemic?  
 Distribution: Central, North  
 On rocky outcrops and on thin soils in rock crevices. In hill country. Restricted to a small area. Known from two cited collections in Zambia.

## MELASTOMATACEAE

**Memecylon zambeziense A. & R.Fern.**  
**Status: VU D2**  
 Endemism: Endemic?  
 Distribution: North  
 Only from Zambia in gallery forests along the Zambezi. Fairly conspicuous shrub of 4 m. Type from Mwinilunga District collected by Angus.

## MORACEAE

**Antiaris taxicaria Lesch. subsp. welwitschii (Engl.) C.C.Berg var. usambarensis (Engl.)**

**C.C.Berg**  
**Status: VU C2a**  
 Distribution: North  
 Zambia is the only country in the Flora zambesiaca region where it is found in evergreen, riverine habitats. This species is known only from Samfyo on Lake Bangweulu in isolated, evergreen forests.

**Ficus usambarensis Warb.**  
**Status: VU D2**  
 Distribution: North  
 There is an isolated occurrence from the main centre in Usamboro (Tanzania). Big, conspicuous tree found in disturbed woodland.

**Milicia excelsa (Welw.) Berg**  
**Status: CR C2b**  
 Distribution: North  
 Can grow up to 20–50 m tall. It is a tropical African genus consisting of two species. Commonly called eroco timber. It is a highly desirable, high-value timber species. Appeared in previous RDLs as globally LR-nt. Heavily utilised in Zambia.

## MYRSINACEAE

**Embelia upembensis Taton**  
**Status: VU B1B2c**  
 Distribution: South  
 Grows in Brachystegia woodland. Also known from DRC.

## OLEACEAE

**Chionanthus richardsiae Stearn**  
**Status: VU A1a**  
 Endemism: Endemic?  
 Distribution: North  
 Grows in sandy and stony soils.

## ORCHIDACEAE

**Brachycarythis conica (Summerh.) Summerh. subsp. langilabris Summerh.**  
**Status: VU D2**  
 Endemism: Endemic?  
 Distribution: West  
 Grassy savanna and in dry sandy dambos. Fusiform tubers. Altitude of 1,300–1,400 m. Type is from Mwinilunga by Milne-Redhead. Possibly found outside Zambia but this cannot be confirmed.

**Disa nyikensis H.P.Linder**  
**Status: VU D2**  
 Endemism: Near-endemic?  
 Distribution: East  
 Grows in montane grasslands at 2,500 m. Recorded from Malawi.

**Disa raeperocharaides Kraenzl.**  
**Status: VU D2**  
 Distribution: Central, West  
 Found in dambo grasslands but rarely from Brachystegia woodland. It is found in a variety of habitats. Probably used for chikando. Wide distribution range. Also known from DRC.

**Disa ukingensis Schltr.**  
**Status: VU D2**  
 Distribution: East  
 Montane short dry grassland. Altitude 2,100–2,800 m. Wide distribution.

**Disperis aphylla Kraenzl. subsp. bifolia Verdc.**  
**Status: VU D2**  
 Distribution: East  
 In leaf litter in deep shade in evergreen forest. Probably overlooked as it is a small plant.

**Disperis bifida P.J.Cribb**  
**Status: CR B1B2c**  
 Endemism: Endemic



Distribution: East  
In a small forest patch, near Rest House (Nyiko Plateau). Probably overlooked as it is a small plant.

**Habenaria hebes la Croix & P.J.Cribb**  
Status: EN A2dB1B2e  
Endemism: Endemic  
Distribution: West  
Seasonally damp grassland (on sandy plateau grassland). Probably used as chikando.

**Habenaria pasmithii G.Will.**  
Status: VU D2  
Distribution: West  
Water meadows of slow flowing water 60 cm deep. Grows with sedges and aquatic herbs. Found on Kolohari sands. Type from Okavango in Botswana. Known from only two collections. Probably more common than currently known.

**Habenaria pubidens P.J.Cribb**  
Status: VU A2c  
Endemism: Near-endemic  
Distribution: East  
Deep shade in evergreen forest. Altitude of 1,700–2,050 m in inaccessible areas. Forms colonies. Used on both sides of the border (also known from Malawi). Narrow distribution range. Big tubers. Probably used as chikanda.

**Habenaria tubifolia la Croix & P.J.Cribb**  
Status: EN A2dB1B2e  
Endemism: Endemic  
Distribution: North  
Open bush with Uapaca trees in a commercial farming area (mostly now abandoned land). Only known from the type specimen. Probably used as chikando.

**Halathrix tridactylites Summerh.**  
Status: VU D2  
Distribution: East  
Dry montane grassland, usually recently burnt. Altitude 2,050–2,300 m. Probably overlooked.

**Malaxis katangensis Summerh. var. pygmaea (Summerh.) P.J.Cribb**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: West  
Found in woodland. Only one citation in Flora zambesiaca, Mwinilunga (1938) by Milne-Redhead. Probably used as chikanda. Probably overlooked because of size.

**Platycoryne brevirastris Summerh.**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: West  
Dambas and granite outcrops over marshy ground over laterite or rock. Kalenda Damba (Mwinilunga) is the type locality. Also in Angola.

**Satyrium micracarys Schltr.**  
Status: VU A2dD2  
Distribution: East  
Montane grassland, usually amongst rocks in seepage areas. Altitude of 1,900–2,300 m. Type from Tanzania. Very large tubers.

**Satyrium manadenum Schltr.**  
Status: VU A2dD2  
Distribution: East  
Habitat is wet montane grassland usually in wetter areas. Altitude more than 2,100 m. The species sometimes forms large colonies. Type from Tanzania. Definitely used as chikanda, based on the size of the tuber.

**Satyrium princeae Kraenzl.**  
Status: VU D2  
Distribution: East  
Found in montane grassland, usually in wetter areas, at an altitude of 1,900–2,400 m. Type from Tanzania.

**Satyrium shirensae Rolfe**  
Status: VU A2d  
Distribution: East  
In montane grasslands, rocky hillsides and seepage slopes. Altitude of 1,750–2,500 m. Type from the Shire Highlands in Malawi. Widely distributed. Small, slender plants. White flowers. Very common and ubiquitous.

## OXALIDACEAE

**Biophytum nyikense Exell**  
Status: VU D2  
Endemism: Endemic  
Distribution: East  
Upland grassland, altitude up to 2,450 m. Type is from the Nyiko Plateau (Zombio). Known from a very small area on the Nyiko in Zambia.

**Biophytum richardsiae Exell**  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
On cliff ledges. Type from the Saisi (a basin on its own) by Richards. Apparently known only from the type.

## PASSIFLORACEAE

**Adenia erecta De Wilde**  
Status: VU D2  
Endemism: Endemic  
Distribution: West  
Type is from the Mujileshi River (Mwinilunga). Found in grassland at the edge of rivers and in Brachystegia woodland. Possibly occurs in Angola. No further information available.

**Adenia tuberifera R.E.Fr.**  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Type from Kalambo Falls. Apparently known only from here. In open woodland and stony places in dry forests.

## POACEAE

**Eragrostis punctiglandulosa Cope**  
Status: VU D2  
Endemism: Endemic  
Distribution: South  
Grows in heavy black clay soils (the whole of the Kafue Flats). Kafue is succumbing to habitat degradation. The type is from Namwola District, along the Kafue River. Is a Kafue Flats endemic.

**Oreobambas buchwaldii K.Schum.**  
Status: CR A1acdB1B2ceB3d  
Distribution: North  
Grows in mist forests. Has been extensively over-utilised. Is known from a few localities, but appears to be extinct at most of the sites. Recent surveys have failed to find it in the Mbala area. The species has been observed in cultivation.

## POLYGALACEAE

**Securidaca welwitschii Oliv.**  
Status: VU B1B2C  
Distribution: West  
Evergreen riparian forests. Habitat type is threatened. The tree is used for medicinal (aspirin) and cosmetic purposes. Known from West and East Africa.

## PROTEACEAE

**Pratea caffra Friis subsp. mafingensis Chisumpa & Brummitt**  
Status: VU D2  
Endemism: Near-endemic

Distribution: East, North  
Altitude of 2,070–2,240 m. Known from the Zombio-Nyiko and the Mafingos. Originally endemic to Malawi.

**Pratea kibarensis Hauman subsp. cuspidata (Beard) Chisumpa & Brummitt**  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Upper Brachystegia woodland and mountain grasslands of 1,800–2,000 m. Type from Mafinga Mountains above Chisengo. Not known whether it is endemic to Zombio.

## RHIZOPHORACEAE

**Cassipourea fanshawei Torre & Gonç.**  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Only known from the type collection. The site is ungazetted. The species grows in thickets.

## RUBIACEAE

**Coffea mufindiensis Hutch. ex Bridson subsp. lundaziensis Bridson**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: East  
The species grows in forest undergrowth and forest fringes at altitudes of 2,050–2,300 m. Also found in Tanzania.

**Fadagia chlarantha K.Schum.**  
Status: VU D2  
Endemism: Near-endemic  
Distribution: Barotseland, West  
Sandy plains at edges of Cryptosepalum woodlands, Kalahari sand species at 1,200 m altitude. Grossy plains and Baikiaea woodland. Also recorded in Angola.

**Fadagia schmitzii Verdc.**  
Status: VU D2  
Distribution: West  
Cryptosepalum–Brachystegia woodland in Kalahari sand, 1,200 m. Type is from Mwinilunga collected by Milne-Redhead. Is a suffrutex of height 35–50 cm. Also recorded from DRC.

**Fadagia variifolia Robyns**  
Status: VU D2  
Endemism: Endemic  
Distribution: West  
Found in open sandy ground on plain and woodland edges. Should have been collected again (common?).

**Hallea stipulasa (DC.) Leroy**  
Status: VU A1cd  
Distribution: Central, North  
Found in swamp forest, fringing woodlands of streams and lakes. Alternative genus name: Metragyna. Locally called 'mupo' (Bemba name). Timber tree of high rainfall areas. Also recorded in Angola, Cameroon, Central African Republic, DRC, Gabon, Ghana, Guinea, Nigeria, Senegal, Sierra Leone and others.

**Oldenlandia geophila Bremek.**  
Status: VU D2  
Endemism: Endemic  
Distribution: West  
Sandy dambas margins and drainage banks. Type from Mfuliro.

**Pavetta jahnstanii Bremek. subsp. brevilaba Bridson**  
Status: VU B1B2bD2  
Distribution: North  
Also known from Tanzania.

**Pavetta redheadii Bremek.**  
Status: VU B1B2cD2  
Endemism: Endemic?

Distribution: West  
Evergreen vegetation, riparian thicket and woodland.  
Altitude of 1,230 m. Type from the Lunga River. Forest has been drastically transformed for banana and sugarcane plantations. Not known whether it is endemic to Zambia.

**Pavetta subumbellata** Bremek. var. *subumbellata*  
Status: VU D2  
Distribution: East  
Forest patches at altitude of 1,750–2,285 m. Type from Tanzania.

**Pentanisia confertifolia** (Baker) Verdc.  
Status: VU D2  
Endemism: Endemic?  
Distribution: North  
Coarse grassland and Brachystegia woodland, sometimes amongst boulders on sandy ground and also in old cultivations. Altitude of 1,500–1,650 m. All collections within a very small area. Type from Lake Tanganyika (Fwamba) collected by Carson. Possibly also in Tanzania.

**Psychotria mwinilungae** Verdc.  
Status: VU D2  
Endemism: Endemic  
Distribution: West  
Riverine forest endemic, altitude of 1,300 m. Type is from Mwinilunga on the West Lunga River (collected in 1975). Should have been found there again. Is a subshrub. Habitat is threatened.

**Psydrax whitei** Bridson  
Status: VU D2  
Endemism: Near-endemic?  
Distribution: North, East  
Evergreen rainforest and forest margins, on rocky outcrops in submontane grasslands. Altitude of 2,100–2,300 m. Type is from Malawi-Nyika Plateau. In Zambia the known localities are in close proximity to each other (highlands).

**Rytigynia adenodonta** (K.Schum.) Robyns subsp. *adenodonta*  
Status: VU B1B2b  
Distribution: North, Central  
Severely fragmented habitats.

**Rytigynia adenodonta** (K.Schum.) Robyns subsp. *reticulata* (Robyns) Verdc.  
Status: VU B1B2b  
Distribution: East  
Only one record in Zambia at an altitude of 1,177–2,000 m.

**Spermacoce annua** Verdc.  
Status: VU D2  
Endemism: Endemic?  
Distribution: West  
Dry dambas, damp soil on rocky outcrops. Altitude of 1,500 m. Type is from near Kaleni Hill in Mwinilunga by Robinsan. Possibly known only from the type.

**Spermacoce bangweolensis** (R.E.Fr.) Verdc.  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Found on bare soil amongst grass clumps. Almost certainly a dune species. Type from Lake Bangweulu. Found on both sides of the lake. Sub-shrub up to 50 cm tall. Habitat disturbed due to the development of the fishing industry.

**Spermacoce perennis** Verdc. var. *fimbriolata* Verdc.  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Dambas and bushland on sandy soil. Type from Luwingu (Chishinga Ranch) by Astle (1961). Same habitat as *Spermacoce perennis* Verdc. var. *perennis*.

**Spermacoce perennis** Verdc. var. *perennis*  
Status: VU D2  
Distribution: North  
Dambas and bushland on sandy soil. Type collected in Luwingu by Jelf (1922).

## RUTACEAE

**Vepris termitaria** Mendonça  
Status: VU B1B2C2  
Distribution: West  
On termite mounds in woodland. An evergreen shrub or small tree up to 3 m. Type is from Kitwe; collected by Fanshawe. Not common and not in dense stands. Distribution scattered.

## SAMYDACEAE

**Homalium molle** Stapf  
Status: VU D2  
Distribution: North  
Type is from from Kunkuta in Mparakasa District. In forest margins and forest patches. Unable to confirm whether it is endemic to Zambia.

## SCROPHULARIACEAE

**Buchnera chisumpae** Philcox  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Grows amongst rocks in dry sandy areas at altitudes of 1,260–1,750 m. There are several localities in Kasama.

**Buchnera cryptocephala** (Baker) Philcox var. *mwinilungensis* Philcox  
Status: VU D2  
Distribution: West  
Habitat is Brachystegia woodland. The species was last collected in 1960. Also recorded in ORC.

**Buchnera ebraceolata** Philcox  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Habitat of the species is open grassland and woodland at altitudes of 1,750–2,500 m. Found in large quantities in Chilangawela.

**Buchnera nervosa** Philcox  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Grows in dambas in sandy areas where it is common. Also known from semi-open woodland. Occurs at an altitude of about 1,300 m.

**Crepidiorhapon involucreatus** (Philcox) Fischer  
Status: VU D2



Participants of the RDL Workshop held in Lusaka.  
(Photo: J.S. Golding)

Endemism: Endemic?  
Distribution: West  
Woodlands, roadsides and stony areas in and bordering gorges. Type from Kabampa Gorge, collected by Robinsan.

**Crepidiorhapon tenuifolius** (Philcox) Fischer  
Status: VU D2  
Distribution: North  
Bogs, swamps and marshy grounds. Altitude of 1,250–1,550 m. Type is from Chilangawela.

**Micrargeriella aphylla** R.E.Fr.  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Swamps and dambas, altitude of 1,290–1,525 m. Type from Kawendimusi.

**Stemodiopsis glandulosa** Philcox  
Status: VU D2  
Distribution: Central  
Grows on rock faces and crevices at an altitude of 1,280 m. Type from Serenje collected by Fanshawe. Known only from a small area in Zambia.

## SELAGINELLACEAE

**Selaginella imbricata** (Forssk.) Spring ex Decne.  
Status: VU D2  
Scarce in southern Africa; always occurs on basalt.

## TURNERACEAE

**Streptopetalum luteoglandulosum** R.Fern.  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Grassland on sandy soils. Type is from Luapula by Richards.

## VITACEAE

**Cyphostemma abercornense** Wild & R.B.Drumm.  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Habitat is rocky hills. Represented only by two collections.

**Cyphostemma rotundistipulatum** Wild & R.B.Drumm.  
Status: VU D2  
Endemism: Endemic  
Distribution: North  
Grows in Brachystegia woodland in sandy soils. A specimen has been collected from a termite mound in the middle of a marsh.



# LOWER RISK

## AMARANTHACEAE

*Pandiana confusa* C.C.Towns.

Status: LR-lc

Distribution: West

Type is from Mwinilungo just south of Motonchi Form. Also recorded from Angola.

*Pandiana richardsiae* Suess.

Status: LR-lc

Endemism: Endemic

Distribution: North

In damp sandy ground, along dambos or in short grass under Uapaca or Protea stands.

## ANACARDIACEAE

*Lannea virgata* R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Distribution: West, Barotseland

Woodlands, sometimes near dambas and on termite mounds. Type from Kosempo by Fonshowe. Very wide distribution.

*Ozoroa kassneri* (Engl. & v.Brehm.) R. & A.Fern.

var. *rhodesica* R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Distribution: Central, North

Type is from Ndundo in Mbolo by Richords.

*Rhus longipes* Engl. var. *schinoides* R.Fern.

Status: LR-lc

Endemism: Endemic?

Distribution: North

Brachystegia woodland and by streams. Type is from 13 km northwest of Mbalo. Known only from the type collection.

## APOCYNACEAE

*Strophanthus angusii* F.White

Status: LR-lc

Distribution: Barotseland, West

Habitat at edge of damba in Kolohori sand. Type from Chikundulu Stream in Mwinilungo District. Is a suffrutex. Reasonably widespread.

## ASCLEPIADACEAE

*Stapelia gigantea* N.E.Br.

Status: LR-nt

Distribution: Central

Widely distributed outside Zombio.

## ASTERACEAE

*Vernonia mushituensis* Wild

Status: LR-lc

Endemism: Endemic?

Distribution: North

Mushitu forest margins. Type from Chilongwelo. Wind-dispersed seed. Possibly endemic to Zombio.

*Vernonia tanganyikensis* R.E.Fr.

Status: LR-lc

Distribution: North

Miamba woodland. Type from Lake Tongonyiko. Also known from East Africa.

## BALSAMINACEAE

*Impatiens limnophila* Launert

Status: LR-lc

Endemism: Endemic

Distribution: North

In wet places in swamps, in mud on river banks. Type from Mbolo collected by Weelon. Flower colour pale mauve or pink. It has great range of variability in its vegetative stages. A prostrate plant.

## CAPPARACEAE

*Boscia cauliflora* Wild

Status: LR-lc

Endemism: Endemic?

Distribution: West

Termite mounds in Brachystegia woodland. Type is from Mwinilungo collected by Milne-Redhead in 1938. Taxonomically possibly sunk.

*Cleome macrophylla* (Klotzsch) Briq.

Status: LR-nt

Distribution: Central, South

This is a mid-Zombezi endemic which occurs on Kolohori soils. Small, discrete pockets of distribution. Grazing by cattle a threat.

## CLUSIACEAE

*Garcinia pachyclada* N.Robson

Status: LR-lc

Endemism: Endemic

Distribution: North

Widespread on plateau woodland on sandy soil.

## CONVOLVULACEAE

*Ipomoea fanshawei* Verdc.

Status: LR-lc

Distribution: Barotseland

Woodlands, damba margins and open sand habitats. Altitude of 1,097 m. Apparently also recorded from Botswana.

## EUPHORBIACEAE

*Croton longipedicellatus* Léonard var.

*brevipedicellatus* Radcl.-Sm.

Status: LR-nt

Endemism: Near-endemic?

Distribution: North, West

Seldom collected. Type from Lake Mweru. Possibly also in Angola.

*Croton polytrichus* Pax subsp. *brachystachys*

Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

Distribution: North, South, West

In dry thicket.

*Phyllanthus caespitosus* Brenan

Status: LR-lc

Endemism: Endemic?

Distribution: North, West

Pyrophyte. Type from Kosomo. Plateau miombo woodland. Not known whether it is endemic to Zombio.

*Phyllanthus microdendron* Welw. ex Mull.Arg. var. *asper* Radcl.-Sm.

Status: LR-lc

Distribution: Barotseland, West

Lost specimen cited was in 1975. Type from Kitwe.

Miombo and Guibourtia-Baikiaea woodland on Kolohori sand. Altitude of 1,000–1,250 m. Also known from Angola.

*Phyllanthus polyanthus* Pax

Status: LR-lc

Distribution: Central, West

Habitat severely reduced. Dry evergreen forest and thicket patches. Well-represented outside Zombio. Apparently also recorded in South Africa.

*Phyllanthus tenuis* Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

Distribution: North

Type from Mbolo District where it is locally common. Sandy soil among rocks and wet grassland.

*Phyllanthus zambicus* Radcl.-Sm.

Status: LR-lc

Distribution: Central, North

Type from Zombio, Kofue Notional Park (Chungo). Floodplain grassland and mopane woodland.

## FABACEAE

*Aeschynomene pseudoglobrescens* Verdc.

Status: LR-lc

Endemism: Endemic

Distribution: North, West

Collected in Kosomo by Richords. The two known localities are very far apart, and the species has probably been overlooked. Habitat is Brachystegia woodland at 1,200 m.

*Brachystegia puberula* Burtt Davy & Hutch.

Status: LR-lc

Distribution: West

Has been overlooked. Common and widespread.

*Cordyla africana* Lour.

Status: LR-lc

Distribution: Central/East, North, South

In small numbers in Luogwo mostly as mature trees (one individual every 2–3 km). The species is common throughout the rest of Zombio, and its habitat is not severely disturbed.

*Crotalaria umbellifera* R.E.Fr.

Status: LR-lc

Endemism: Endemic

Distribution: North, West

Widespread.

*Dialium angolense* Welw. ex Oliv.

Status: LR-lc

Distribution: Central, North, West

Widespread in Zombio. Grows as part of moteshe forest, associated with Itigi thicket. Found in riverine fringes.

*Kotschyia prittwitzii* (Harms) Verdc. var. *parviflora* Verdc.

Status: LR-lc

Endemism: Endemic

Distribution: North, West

It probably has a much wider distribution than currently known. The type is from Kowombwo, collected by Fanshowe. Riverside Brachystegia woodland.

*Tephrosia coronilloides* Welw. ex Baker

Status: LR-lc

Distribution: South

It is recorded from sandy places on Kolohori sand. Type from Angola. Widespread. There are probably several more localities because the habitat is extensive.

*Tephrosia richardsiae* Gillett subsp. *erucifera*  
**Brummitt**  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: North  
 Rocky plateau woodland, a common habitat. Occurs on rocky hills in undisturbed areas. Widespread along the Great North Road.

## GENTIANACEAE

*Exacum oldenlandioides* (S.Moore) Klackenb.  
**Status:** LR-nt  
 Habitat is along streams and river banks. Widespread. Well-represented outside Zambia.

## GESNERIACEAE

*Streptocarpus* aff. *michelmerei* Hilliard & B.L.Burtt  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Central, West  
 Found in deep gorges and inaccessible areas. Known from several localities. Characterised by its unifoliate leaves. Similar-looking taxon in Malawi (Viphyo). Known from the specimens of Mutimushi 3335 (1965) and Williamson 1727 (1969).

## HYPOXIDACEAE

*Curculigo pilosa* (Schum. & Thonn.) Engl.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: Central, North, South  
 It grows among rocks, crevices and in dombas. It is probably used for its medicinal properties as an alternative to African Potato.

## IRIDACEAE

*Moraea brevifolia* Goldblatt  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: North, West  
 Marshy habitats. The type is Lumongwe Falls in Mporokosa District.

## LOBELIACEAE

*Monopsis stellarioides* (Presl) Urb.  
**Status:** LR-lc  
 Distribution: North  
 Widespread. Habitat in Lumongwe is about to be destroyed because of the development of a hydroelectric scheme.

## MALVACEAE

*Triplachiton zambesiacus* Milne-Redh.  
**Status:** LR-lc  
 Distribution: West  
 Found on termite mounds, but also in floodplains on silty sands and on riverbanks. Restricted to the valley floor. Mid-Zambezi endemic. Type is from Zimbabwe. Wood is hard and is used for yokes.

## MELASTOMATACEAE

*Dichaetanthera erici-rosenii* (R.E.Fr.) A. & R.Fern.  
**Status:** LR-lc  
 Distribution: North  
 Found in rocky places mainly at waterfalls and in woodlands. Also recorded from Tanzania.

*Dissotis simonis-jamesii* Buscal. & Muschl.  
**Status:** LR-lc  
 Endemism: Endemic  
 Distribution: North  
 The species was collected at Lake Bengweulu up to Mbala. It is known only from swamps in northern Zambia. The range covers a wide area. Habitats are not under threat.

## MELIACEAE

*Khaya anthotheca* (Welw.) C.DC.  
**Status:** LR-nt  
 Known from gorges. Wide distribution, only on Kolohori sand of the Western Province. Riparian and chipya forests. Popular as a cultivated tree. Also known from Angola, Cameroon, Ivory Coast, DRC, Ghana and others.

*Turraea zambesica* Sprague & Hutch. ex Hutch.  
**Status:** LR-nt  
 Distribution: West

## MENYANTHACEAE

*Nymphoides tenuissima* A.Raynal  
**Status:** LR-lc  
 Distribution: North  
 Temporary pools, altitude of 900–1,200 m. Also known from DRC.

## MORACEAE

*Ficus ottoniifolia* (Miq.) Miq. subsp. *macrocyce*  
 Berg  
**Status:** LR-lc  
 Extremely widespread. Habitat in riverine forests in rocky gorges; on rocks in rapids and in swamp forest mushitu.

*Morus mesozygia* Stapf ex A.Chev.  
**Status:** LR-nt  
 Distribution: North, East  
 This is the only African species in the genus. It grows up to 40 m tall. It is not known whether this species is endemic to Zambia. Not common. Wide distribution in Zambia and other countries.

## ORCHIDACEAE

*Brachycorythis pilosa* Summerh.  
**Status:** LR-lc  
 Distribution: North, West  
 Scrub and woody grassland and swamp. Type from Tanzania. Widespread.

*Disa dichroa* Summerh.  
**Status:** LR-lc  
 Endemism: Endemic?  
 Distribution: North, West  
 Known from many collections from Mbolo. Possibly found in Tanzania.

*Disa welwitschii* Rchb.f. subsp. *welwitschii*  
**Status:** LR-nt  
 Grows in damp grasslands and dombas, common where it occurs.

*Habenaria argentea* P.J.Cribb  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: North, West, Central  
 In swampy grassland. Seems widespread. Probably used as chikanda.

*Habenaria hirsutitrunci* G.Will.  
**Status:** LR-nt  
 Endemism: Near-endemic?  
 Distribution: North, East  
 Mantane grassland. Probably used as chikanda.

Widespread. Type from Luangwa River, 50 km south of Mporokosa near the Kalungwishi River. Also known from Malawi.

*Habenaria humilior* Rchb.f.  
**Status:** LR-nt  
 Distribution: Central, South, East  
 Altitude of 1,900–2,200 m in grassy dombas.

*Habenaria leucotricha* Schltr. var. *reticalcar* la Croix  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: West, North, Central, East  
 Woodland on stony ground. Has a vast habitat range. Probably used as chikanda.

*Habenaria velutina* Summerh.  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: Central, North  
 In grassland often near streams. Widespread distribution. Common habitat. Probably used as chikanda.

*Nervilia bicarinata* (Bl.) Schltr.  
**Status:** LR-lc  
 Distribution: North, Central, South  
 Riverine forest. Not harvested. Also in Senegal, Yemen, Ethiopia, Rwanda, Tanzania, DRC and West Africa, Nigeria, Central African Republic, Madagascar, Mascarenes, Comoros and so forth.

*Platycoryne isoetifolia* P.J.Cribb  
**Status:** LR-nt  
 Endemism: Endemic  
 Distribution: North, East  
 Wet and dry dombas, altitude of 1,350 m. Does not seem to be used as chikanda because it has small tubers. Type from Shiwo Ngundu.

*Platycoryne latipetala* Summerh.  
**Status:** LR-lc  
 Endemism: Near-endemic  
 Distribution: West  
 Wet peaty swamps, altitude of 1,200–1,400 m. Type from Sinkobolo in Mwinilunga. Also in DRC.

*Platycoryne micrantha* Summerh.  
**Status:** LR-lc  
 Endemism: Near-endemic  
 Distribution: West  
 Marshy grassland. Type from Mwinilunga, west of Dobeka Bridge. Also recorded in Angola.

*Platycoryne proteatrum* (Rchb.f.) Rolfe var. *recurvirostrum* G.Will.  
**Status:** LR-nt  
 Endemism: Endemic?  
 Distribution: North  
 Low-lying block soils of peaty dombas and swamps. Locally dominant and widespread. Like an epiphyte in rattling grass mats. The genus is unlikely to be used for chikanda. Not known whether it is endemic to Zambia.

*Platylepis glandulosa* (Lindl.) Rchb.f.  
**Status:** LR-lc  
 Endemism: Endemic?  
 Distribution: Central  
 Swamp species in deep marshy forests. Flowers from December to February. Possibly overlooked due to its small insignificant flowers. Not known whether it is endemic to Zambia.

*Roeperocharis wentzeliana* Kraenzl.  
**Status:** LR-lc  
 Distribution: East  
 Mantane grassland in damp areas. Altitude of 1,700–2,440 m. Type is from Tanzania. Widespread. Known from a small area in Zambia. Possibly used as chikanda.



## PASSIFLORACEAE

***Adenia cissampeloides* (Planch. ex Hook.) Harms**  
**Status:** LR-lc  
**Distribution:** North  
*Type is from Kolombo Falls in Mbolu. On rocky slopes with Brachystegia woodland. Species is common and dominant.*

***Adenia ovata* De Wilde**  
**Status:** LR-lc  
**Endemism:** Endemic?  
**Distribution:** West, North  
*Type is from Mufuliro on the Copperbelt. Brachystegia woodland on lateritic and sandy soils. Seems to be widespread. Not known whether it is endemic to Zambia.*

***Adenia repanda* (Burch.) Engl.**  
**Status:** LR-nt  
**Endemism:** Near-endemic?  
**Distribution:** East  
*Kolohori sand endemic. Appears in the rainy season. Tourists are known to collect the plant. Generally uncommon in Zambia but wide distribution. Possibly more widespread along the Chobe/Zambezi Rivers.*

***Basananthe baumii* (Harms) De Wilde var. *caerulescens* (A. & R.Fern.) De Wilde**  
**Status:** LR-lc  
**Distribution:** Barotseland, West  
*Found in miombo woodlands. Dry woodland in open sandy ground. Also in Angola.*

***Basananthe holmesii* R. & A.Fern.**  
**Status:** LR-lc  
*IUCN TPC (1981).*

## POACEAE

***Brachiaria pungipes* Clayton**  
**Status:** LR-lc  
**Endemism:** Endemic?  
**Distribution:** West  
*Grossland on sandy soils, at altitude of 1,500 m. Type from Dobeko Bridge in Mwinilungo. Fairly wide distribution. Possibly also in Angola and DRC.*

***Digitaria bidactyla* Van der Veken**  
**Status:** LR-nt  
**Endemism:** Endemic  
**Distribution:** North  
*Grows in dombos and in wet sands at altitudes of 1,600–1,700 m. Known from several collections from only one locality. Not known from elsewhere.*

***Digitaria tenuifolia* Goetgh.**  
**Status:** LR-nt  
**Endemism:** Endemic  
**Distribution:** North  
*Found in shallow depressions on flat rocks (altitude of 1,400 m).*

***Eccoptocarpa obconiciventr* Launert**  
**Status:** LR-lc  
**Distribution:** North  
*Type is from Kosomo. In open places. Altitude 1,000–1,500 m. Distribution extends into Zambia from Tanzania. Monotypic genus. Found over a wide area. Is on annual grass.*

***Eragrostis anacantha* Cope**  
**Status:** LR-lc  
**Endemism:** Endemic  
**Distribution:** Central, North  
*Found growing in dombos, in seasonally wet woodlands beside rivers.*

***Eragrostis anacanthoides* Cope**  
**Status:** LR-lc  
**Endemism:** Endemic  
**Distribution:** Central, North

*Common on rocks beside running water. Altitude of about 1,600 m.*

***Eragrostis dentifera* Launert**  
**Status:** LR-nt  
**Endemism:** Endemic  
**Distribution:** North  
*Altitude of about 1,700 m in seasonally wet grassland.*

***Eragrostis divaricata* Cope**  
**Status:** LR-lc  
**Distribution:** West  
*Found in lateric ponds and on peaty soils and damp holes. Altitude of 1,400 m. Also recorded in DRC.*

***Eragrostis fimbrilata* Cope**  
**Status:** LR-lc  
**Endemism:** Endemic  
**Distribution:** Central, West  
*The type is from Kitwe by Fonshowe. Found in dombos margins in high rainfall areas. It has possibly been overlooked.*

***Eragrostis lepidobasis* Cope**  
**Status:** LR-nt  
**Endemism:** Endemic  
**Distribution:** West  
*Found in wet areas and watershed areas. Known only from the type collection. Must have been overlooked by collectors.*

***Eragrostis mariae* Launert**  
**Status:** LR-nt  
**Endemism:** Endemic  
**Distribution:** North  
*Found in dombos in swampy grassland usually in peaty soil at altitudes of 1,700 m. Type is from Lake Chilo.*

***Eragrostis milnei* Launert ex Cope**  
**Status:** LR-nt  
**Endemism:** Endemic?  
**Distribution:** West  
*Found in dombos and standing water in lateric ponds. Type is from Kolendo Dombu in Mwinilungo. Known only from two collections. So far known only from this locality, but may also occur in DRC and Angola.*

***Eragrostis oligostachya* Launert ex Cope**  
**Status:** LR-nt  
**Distribution:** West  
*Found in dombos in damp grassland, in laterite and margins in shallow pools near rocky outcrops.*

***Eragrostis spicigera* Cope**  
**Status:** LR-nt  
**Endemism:** Endemic  
**Distribution:** North  
*Watershed grassland in sandy soil at an altitude of 1,400–1,450 m. Known only from the type locality where it was collected four times by Astle.*

***Hydrothauma manicatum* Hubb.**  
**Status:** LR-lc  
**Distribution:** North, West  
*An aquatic grass, it grows in shallow pools on ironstone outcrops.*

***Hyparrhenia anemopaegma* Clayton**  
**Status:** LR-lc  
**Endemism:** Endemic  
**Distribution:** Central/East  
*It has a limited notional distribution.*

***Lophachme parva* Renvoize & Clayton**  
**Status:** LR-lc  
**Endemism:** Endemic  
**Distribution:** North, Central  
*Dombos and damp places beside rivers. Altitude of 1,400–1,700 m. Type from Shiwo Ngundu.*

***Panicum bullockii* Renvoize**  
**Status:** LR-lc  
**Endemism:** Endemic?  
**Distribution:** North

*Woodland on mountain slopes, on oreaceous soils. Altitude of 1,750–2,000 m. Type from Chishimbo Falls in Kosomo District. Probably a number of collections. Not known whether it is endemic to Zambia.*

***Panicum pseudoracemosum* Renvoize**  
**Status:** LR-lc  
**Endemism:** Endemic?  
**Distribution:** West, North  
*Damp places in shade. Altitude of 1,350–1,650 m. Type from Mwinilungo near the Koombo River. Widespread distribution. Not known whether it is endemic to Zambia.*

***Pogonarthria refracta* Launert**  
**Status:** LR-lc  
**Endemism:** Endemic  
**Distribution:** South, North  
*Kolohori sands, in woodland on disturbed ground. Altitude of 1,000 m. Type from Nomwolo (collected in 1962).*

***Setaria pseudaristata* (Peter) Pilg.**  
**Status:** LR-nt  
*Widespread. Also found in East Africa and further afield.*

## POLYGALACEAE

***Polygala friesii* Chodat**  
**Status:** LR-lc  
**Endemism:** Endemic?  
**Distribution:** North, West  
*Habitat in swamps and peat bogs and marshy grassland. Altitude of 1,700–1,750 m. Type from near Monso. Widespread. Not known whether it is endemic to Zambia.*

## PORTULACACEAE

***Portulaca foliosa* Ker Gawl.**  
**Status:** LR-nt

## PSILOTACEAE

***Psilotum nudum* (L.) P.Beauv.**  
**Status:** LR-lc  
*Riverine or wet miombo species. A cosmopolitan species, but seldom common anywhere. The species is rare but extremely widespread in Zambia. Its habitat is not threatened.*

## ROSACEAE

***Prunus africana* (Hook.f.) Kalkm.**  
**Status:** LR-nt  
*Widespread but uncommon habitat. Also in Angola, Burundi, Cameroon, DRC, Equatorial Guinea (Bioko), Ethiopia, Kenya, Madagascar, Mozambique, Rwanda, São Tomé & Príncipe and South Africa (Eastern Cape, Gauteng, KwaZulu-Natal, Mpumalanga, Limpopo Province).*

## RUBIACEAE

***Batopedina linearifolia* (Bremek.) Verdc.**  
**Status:** LR-lc  
**Endemism:** Endemic  
**Distribution:** Central, West  
*Crevice on granite hills at 1,250 m. Habitat is not threatened. Plant is 10–25 cm tall.*

***Fadogia tomentosa* De Wild. var. *calvescens* (Verdc.) Verdc.**  
**Status:** LR-lc  
**Endemism:** Near-endemic  
**Distribution:** Barotseland, West  
*Brachystegia–Cryptosepalum woodland and Kolohori*

sond. Type from Mochili in Western Province. Probably not common.

**Fadogia triphylla Baker var. gracilifolia Verde.**

**Status: LR-lc**

**Distribution:** North

Grows in degraded habitat of Monotes, Brachystegia and Uapaca woodland. Also old cultivations, i.e. in degraded miombo. Type from southwestern Tonsonio.

**Otiophora angustifolia Verde.**

**Status: LR-lc**

**Endemism:** Endemic?

**Distribution:** North

On rocky outcrops. Fairly widespread. Distance between the two known localities is about 400 km. Possibly uniformly distributed between these localities. Dwarf shrub/woody herb.

**Sericanthe andongensis (Hiern) Robbrecht var. andongensis**

**Status: LR-nt**

In riverine forest. Widespread. Occurs further north through Tropical Africa.

**Tapiphyllum cinerascens (Hiern) Robyns var.**

**laetum (Robyns) Verdc.**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** East, North

Brachystegia woodland in rocky places. Altitude of 900–1,350 m. Widespread.

**Tapiphyllum cinerascens (Hiern) Robyns var.**

**richardsii (Robyns) Verdc.**

**Status: LR-lc**

**Distribution:** North

Grossland, Combretum–Grewia thicket and Brachystegia woodland. Sandy soil sometimes in rocky places. Altitude of 1,200–1,500 m.

**Tapiphyllum molle Robyns**

**Status: LR-lc**

**Distribution:** Barotseland, North, West

Julbernardia and Brachystegia woodland on Kolohori sond. Type from Angola. Several localities known from northwestern Zambia have been provisionally included in this taxon pending a full taxonomic investigation. Widespread. Not utilised.

**Tapiphyllum rhodesiacum (Tennant) Bridson**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** Central, North

Habitat is escarpment vegetation, thicket and woodland on granite rocks and very stony ground. Often on rocky hills in Brachystegia woodland. Type from Serenje District by Fongshwe. A shrub to a small tree.

## RUTACEAE

**Vepris mendoncana W.Mziray**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North

Found in riverine forests.

## SAPINDACEAE

**Blighia unijugata Baker**

**Status: LR-nt**

**Distribution:** North

Not common in Zambia.

**Deinbollia fanshawei Exell**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** Barotseland, West

Known only from Barotseland in Kolohori sond woodland.

**Eriocoelum lawtonii Exell**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North, West

Habitat is riverine forest, which is not particularly threatened. The type is from Kosomo District, Kowombo. Fairly widespread.

## SCROPHULARIACEAE

**Alectra glandulosa Philcox**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North, South

In moist grassland from 1,500–1,830 m. Type is from 32 km from Mwinilungo on the road to Solwezi at Mundwizi Dombo, altitude 1,700 m.

**Alectra pubescens Philcox**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North

Type from Mbolo on Chilongowelo Escarpment at 1,500 m.

**Buchnera laxiflora Philcox**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** West, North

Grows in dombos at altitudes up to 1,200–1,400 m.

**Buchnera trilobata Skan**

**Status: LR-lc**

**Distribution:** West, North

Grows in montane grassland and Brachystegia woodland up to altitudes of 2,500 m. Species is scattered over a wide area in Zambia. Seeds are small and mobile. Also recorded from Malawi.

**Crepidiorhopalon bifolius (Skan) Fischer**

**Status: LR-lc**

**Endemism:** Endemic?

**Distribution:** North, West

Wet areas up to an altitude of 1,500 m. Type is from Kombole. Widespread. Known only from Flora zambeiaca area and is possibly a Zambian endemic. Often collected. Habitat is common.

## STRYCHNACEAE

**Strychnos xantha Leeuwenb.**

**Status: LR-lc**

**Endemism:** Endemic?

**Distribution:** North, West

In gallery forests or riverine thickets. Possibly a Zambian endemic but needs verification.

## TILIACEAE

**Corchorus saxatilis Wild**

**Status: LR-lc**

**Endemism:** Endemic?

**Distribution:** South, West, Central

Widespread on shallow soil and rocky outcrops.

**Triumfetta tenuipedunculata Wild**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North, West

Damp shady woodland. Type is from Mbolo District. Widespread. Small herb.

## TURNERACEAE

**Stapfiella zambeiensis R.Fern. forma grandifolia R.Fern.**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North

Margins of mushitu near streams, which is not a particularly endangered habitat. This taxon (Stapfiella zambeiensis forma grandifolia) has larger leaves than the other (Stapfiella zambeiensis forma zambeiensis). Taxonomy needs to be resolved.

**Stapfiella zambeiensis R.Fern. forma zambeiensis**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North

Margins of mushitu near streams, which is not a particularly endangered habitat. Type is from 8 km east of Kosomo by Robinson.

## VELLOZIACEAE

**Xerophyta villosa (Baker) Smith & Ayensu**

**Status: LR-nt**

Fairly common.

## VITACEAE

**Cissus fanshawii Wild & R.B.Drumm.**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North, West

Grows on termite mounds in Brachystegia woodland.

**Cyphostemma richardsiae Wild & R.B.Drumm.**

**Status: LR-lc**

**Endemism:** Endemic?

**Distribution:** North, West

Found in Brachystegia woodland.

**Cyphostemma saxicolum (Gilg & R.E.Fr.) Descouings ex Wild & R.B.Drumm.**

**Status: LR-lc**

**Endemism:** Endemic

**Distribution:** North

Grows in dense riverine forest and in dense, dry woodland. Five collections from Mbolo.



**Satyrium sceptrum**, probably used as **chikanda**. (Photo: G. Williamson)



# DATA DEFICIENT

## ACANTHACEAE

**Duosperma cuprinum** Brummitt  
Status: DD  
Endemism: Endemic?  
Source: IUCN TPC (1981)

**Duosperma fanshawei** Brummitt  
Status: DD  
Endemism: Endemic?  
Source: IUCN TPC (1981)

**Duosperma fimbriatum** Brummitt  
Status: DD  
Endemism: Endemic?  
Source: IUCN TPC (1981)

**Justicia salviaoides** Milne-Redh.  
Status: DD  
Distribution: North  
Itigi thicket endemic. Leafless shrub. Also known from Tonzonio.

## AMARANTHACEAE

**Celasia chenapodifolia** Baker  
Status: DD  
Distribution: West  
In Angola it grows in abandoned cultivated fields in damp soils. In Zambia, it is known from a few specimens collected along a roadside. This is quite likely a weed but this information is unavailable.

## AMARYLLIDACEAE

**Crinum subcernuum** Baker  
Status: DD  
Distribution: Central, South

## ANACARDIACEAE

**Lannea gassweileri** Exell & Mendonça subsp. *tomentella* (R. & A.Fern.) Gillett  
Status: DD  
Endemism: Endemic?  
Distribution: North  
Woodlands of several types on sandy plains. Type from Shiwo Ngandu. The species is used for rope-making. Unable to confirm whether it is endemic.

**Lannea schimperi** (Hochst. ex A.Rich.) Engl.  
Status: DD  
Endemism: Endemic?  
Distribution: Central, South, West  
The taxonomy of this species probably needs attention. It has a smooth white bark.

**Ozaraa bredoi** R. & A.Fern.  
Status: DD  
Endemism: Endemic  
Distribution: North  
Known only from the type.

**Ozaraa viridis** R. & A.Fern.  
Status: DD  
Endemism: Endemic?  
Distribution: Central  
Type from Mkushi Bomo.

**Rhus achracea** Meikle var. *saxicala* R. & A. Fern.  
Status: DD  
Endemism: Endemic?  
Distribution: North  
Type is from the Muchingo Escarpment. Known only from the type collection, although Angus's specimen is doubtful.

**Sorindeia undulata** R. & A.Fern.  
Status: DD  
Endemism: Endemic  
Distribution: North  
In riverine forest. Type collected by Fonshowe.

## APONOGETONACEAE

**Apanogeton stuhlmannii** Engl.  
Status: DD  
Source: IUCN TPC (1981).

## ARECACEAE

**Hyphaena petersiana** Klotzsch  
Status: DD  
Distribution: North, East, Central  
Sparsely scattered palm tree, in patches. Recovery rate very low.

## ASCLEPIADACEAE

**Ceropegia cataphyllaris** Bull.  
Status: DD  
The taxonomy may need checking.

## ASPHODELACEAE

**Alaie bicomitum** L.C.Leach  
Status: DD  
Endemism: Near-endemic?  
Distribution: North  
Collected by Richards in Mbalo (near Kolombo River) but problem with collection numbering. Leach subsequently cultivated it. Reported to have been recently seen on an island in northern Zambia at the Tonzonio border. Currently known only from a small area in the vicinity of the type locality.

**Aloe enatata** L.C.Leach  
Status: DD  
Endemism: Endemic

**Alaie luapulana** L.C.Leach  
Status: DD  
Endemism: Near-endemic?  
Distribution: North  
Collected along the DRC border. Currently known only from the type, but this needs confirmation.

**Aloe milne-redheadii** Christian  
Status: DD  
Endemism: Endemic?  
Distribution: West  
Type from Mwinilunga. Reported to be common in miombo woodland at the type locality. Possibly also in Angola and DRC but this cannot be confirmed; apparently known only from the type.

**Alaie veseyi** Reynolds  
Status: DD  
Endemism: Endemic?  
Distribution: North  
Type from near Kolombo Falls collected by Richards. Possibly also in Tonzonio but this cannot be confirmed.

## ASPLENIACEAE

**Asplenium chaseanum** Schelpe  
Status: DD  
Distribution: North  
On rocks in forest in deep shade. Type from Manso

District by White. Also recorded in DRC. Initially suggested that it should be removed from the RDL.

## ASTERACEAE

**Bidens oligoflora** (Klatt) Wild  
Status: DD  
Taxonomy needs attention.

**Erythracephalum dictyophlebium** Wild  
Status: DD  
Endemism: Endemic  
Distribution: North  
Found in grassland. Known only from the type collection. Not really a well-collected area.

**Lophalaena alata** Duvign.  
Status: DD  
Endemism: Endemic?  
Distribution: Central, West  
Small pyrophyte with woody rootstock. Found in plateau woodland. Collected by Fonshowe in Luonshyo (1954) and Mpongwe (1957).

**Pleiotaxis angustirugosa** Jeffrey  
Status: DD  
Endemism: Endemic  
Distribution: Barotseland  
Type is from Chovumo. Endemic to Barotseland.

**Rastraphyllum pinnatipartitum** Wild & G.V.Pope  
Status: DD  
Endemism: Endemic  
Distribution: West  
In seasonally damp grassland. Monotypic genus. Type from Ikelenje in Mwinilunga (collected in 1965). Known only from the type collection.

**Vernania heladea** Wild  
Status: DD  
Endemism: Endemic?  
Distribution: North  
Swampy grassland. Type from the Loyi Flats in Mbalo (1965). Apparently known only from the type.

**Vernania lycioides** Wild  
Status: DD  
Endemism: Endemic  
Distribution: West  
Woodland. Type from 32 km south of Mwinilunga on the road to Kobompo. Known only from the type. A sub-shrub.

**Vernania madefacta** Wild  
Status: DD  
Endemism: Endemic  
Distribution: North  
Habitat is damp rocks by waterfalls. Type from Chilongowelo in Mbalo District. Known only from the type.

## BALSAMINACEAE

**Impatiens hydrogetanoides** Launert  
Status: DD  
Endemism: Endemic  
Distribution: North  
Habitat in waterfall spray in dense shade, in a ravine in evergreen forest. Flower colour pink. Zambia-Mofingo is not well-collected.

## BEGONIACEAE

**Begonia pygmaea** Irmischer  
Status: DD  
Endemism: Endemic

Distribution: North  
In riverine forest, altitude of 910 m. Type from Lunzuo near Mbolo, by Richards (1955). Known only from the type.

## BORAGINACEAE

***Cystostemon loveridgei* Martins**  
**Status:** DD  
Endemism: Endemic  
Distribution: West

***Cystostemon mwiniungensis* Martins**  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
Grows in degraded Cryptosepalum and Copaifera forests, savanna woodland on Kolohori sands.

## BRASSICACEAE

***Coronopus zambiensis* Jonsell**  
**Status:** DD  
Source: IUCN TPC (1981).

## CAMPANULACEAE

***Wahlenbergia cephalodina* Thulin**  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
Habitat is woodland on Kolohori sand. Type is from Kobompo. Unclear whether it is known only from the type. Check taxonomy.

## COMBRETACEAE

***Combretum padoides* Engl. & Diels**  
**Status:** DD  
Endemism: Endemic?  
Distribution: North, East, South

## COMMELINACEAE

***Aneilema richardsiae* Brenan**  
**Status:** DD  
Endemism: Endemic  
Source: IUCN TPC (1981).

***Commelina grandis* Brenan**  
**Status:** DD  
Source: IUCN TPC (1981)

***Commelina pycnospatha* Brenan**  
**Status:** DD  
Endemism: Endemic?  
Distribution: Central  
Deciduous forest on steep gorge slopes.

## CONVOLVULACEAE

***Ipomoea milnei* Verdc.**  
**Status:** DD  
Distribution: North  
On sandy and rocky hills. Altitude of 1,320–1,341 m. Type from Angola.

***Ipomoea protea* Britten & Rendle**  
**Status:** DD  
Distribution: North  
Sandy soils on roadsides, altitude 1,650 m. Type from Angola.

***Merremia stellata* Rendle**  
**Status:** DD  
Distribution: West  
In woodland. Type from Angola.

## CUCURBITACEAE

***Trochomeria subglabra* Jeffrey**  
**Status:** DD  
Endemism: Endemic  
Distribution: West, North  
Ecology and habitats are unknown. Type from Motonchi Form by Milne-Redhead. Widespread.

## CYPERACEAE

***Actinoschoenus repens* J.Raynal**  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
Known mainly from the collections of Milne-Redhead.

***Alinula malawica* (J.Raynal) Goetgh. & Vorster**  
**Status:** DD  
Distribution: North  
Also known from Malawi.

***Ascolepis ampullacea* J.Raynal**  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
Only known from type.

***Ascolepis majestuosa* Duvign. & Léonard**  
**Status:** DD  
Distribution: North, Barotseland

***Ascolepis protea* Welw. subsp. *atropurpurea* Lye**  
**Status:** DD  
Endemism: Near-endemic?  
Distribution: North  
Possibly occurs in southern Tonzonio.

***Ascolepis protea* Welw. subsp. *chrysocephala* Lye**  
**Status:** DD  
Endemism: Near-endemic?  
Records for it from southern Tonzonio but reported (unconfirmed) to occur in northern Zombio at the Tonzonion border.

***Ascolepis pseudopeteri* Goetgh.**  
**Status:** DD  
Endemism: Near-endemic?  
Distribution: West  
Possibly occurs in southern Tonzonio.

***Ascolepis pusilla* Ridley var. *echinata* Hooper**  
**Status:** DD  
Endemism: Near-endemic  
Distribution: West  
Occurs in Tonzonio.

***Ascolepis trigona* Goetgh.**  
**Status:** DD  
Distribution: North

***Bulbostylis micromucronata* Goetgh.**  
**Status:** DD  
No herbarium material from Zombio in Kew.

***Carex robinsonii* Podl.**  
**Status:** DD  
Endemism: Endemic  
Distribution: East  
No material in Kew, just a description.

***Cyperus altchrysocephalus* Lye**  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
Source: IUCN TPC (1981). No herbarium material at Kew.

***Cyperus kasamensis* Podl.**  
**Status:** DD  
Endemism: Endemic  
Distribution: North

Source: IUCN TPC (1981). No herbarium material at Kew.

***Cyperus mwiniungensis* Podl. var. *maior* Podl.**  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
Source: IUCN TPC (1981).

***Cyperus robinsonii* Podl.**  
**Status:** DD  
Endemism: Endemic  
Distribution: South  
Source: IUCN TPC (1981).

***Cyperus zambesiensis* C.B.Cl.**  
**Status:** DD  
Apparent taxonomic confusion with *Cyperus glaucophyllus* var. *zambesiensis*.

***Lipocarpha echinus* J.Raynal**  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
Source: IUCN TPC (1981).

***Lipocarpha robinsonii* J.Raynal**  
**Status:** DD  
Endemism: Near-endemic  
Distribution: North, West, South, Barotseland  
Also known from Angola.

***Pycreus atrorubidus* Nelmes**  
**Status:** DD  
Endemism: Endemic  
Distribution: West

***Pycreus heterochrous* Nelmes**  
**Status:** DD  
Endemism: Endemic  
Distribution: West

***Pycreus micromelas* Lye**  
**Status:** DD  
Endemism: Endemic?  
Distribution: North  
Possibly occurs in southern Tonzonio.

***Pycreus poikilostachys* Nelmes**  
**Status:** DD  
Endemism: Endemic  
Distribution: West

***Schoenoplectus rhodesicus* (Podl.) Lye**  
**Status:** DD  
Endemism: Near-endemic  
Distribution: North  
Also known from Tonzonio.

***Scleria calcicola* Robinson**  
**Status:** DD  
Endemism: Near-endemic?  
Distribution: West  
Possibly occurs in southern Tonzonio.

***Scleria chlorocalyx* Robinson**  
**Status:** DD  
Endemism: Endemic  
Distribution: North, West  
Source: IUCN TPC (1981).

***Scleria delicatula* Nelmes**  
**Status:** DD  
Endemism: Near-endemic  
Distribution: West, North  
Possibly occurs in southern Tonzonio.

***Scleria fulvipilosa* Robinson**  
**Status:** DD  
Endemism: Endemic?  
Distribution: North  
Possibly occurs in southern Tonzonio.



**Scleria lucentinigricans** Robinson  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Source: IUCN TPC (1981).*

**Scleria patula** Robinson  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
*Source: IUCN TPC (1981).*

**Scleria polyrrhiza** Robinson  
**Status:** DD  
Endemism: Endemic  
Distribution: North, West  
*Source: IUCN TPC (1981).*

**Scleria procumbens** Robinson  
**Status:** DD  
Endemism: Endemic?  
Distribution: North  
*Possibly occurs in southern Tanzania.*

**Scleria xerophila** Robinson  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
*Source: IUCN TPC (1981).*

**Scleria zambesica** Robinson  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
*Source: IUCN TPC (1981).*

**Volkiella disticha** Merxm. & Czech.  
**Status:** DD  
*Apparently no Zambian specimens at Kew. Expected to occur in Zambia, Zimbabwe and Namibia.*

DICHAPETALACEAE

**Dichapetalum whitei** Torre  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
*Habitat is deciduous Sarcacephalis and Albizia woodland.*

EBENACEAE

**Diospyros mweruensis** F.White  
**Status:** DD  
Endemism: Near-endemic?  
Distribution: North  
*Found in miamba woodland and Itigi thicket. Associated with termite mounds (olttitude 800–1,500 m). Also recorded from DRC.*

EUPHORBIACEAE

**Acalypha dikuluwensis** Duvign. & Dewit.  
**Status:** DD  
Endemism: Near-endemic?

**Croton gossweileri** Hutch.  
**Status:** DD  
Distribution: West  
*Single collection from Zambia. Riverine forest. Also from Angola.*

**Euphorbia cooperi** N.E.Br. ex Berger var. **calidicola** L.C.Leach  
**Status:** DD  
Endemism: Endemic  
Distribution: East, Central/East, South  
*Widespread. Associated with rocky habitats.*

**Euphorbia cooperi** N.E.Br. ex Berger var. **ussanguensis** (N.E.Br.) L.C.Leach

**Status:** DD  
Endemism: Endemic  
Distribution: Central, North  
*Locally camman.*

**Euphorbia decidua** Bally & L.C.Leach  
**Status:** DD  
Endemism: Endemic  
Locally common.  
  
**Euphorbia fortissima** L.C.Leach  
**Status:** DD  
Endemism: Near-endemic?  
Distribution: Central, South  
*Mid-Zambezi Valley. Valley thickets and basalt gorges.*

**Euphorbia griseola** Pax subsp. **zambiensis** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: Central  
*Type from Kapiri Mpashi.*

**Euphorbia inundaticola** L.C.Leach  
**Status:** DD  
Endemism: Endemic  
Distribution: East

**Euphorbia jubata** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: Central  
*Locally camman. Associated with rocky habitats.*

**Euphorbia luapulana** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: North

**Euphorbia mwinilungensis** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: West  
*Locally camman.*

**Euphorbia papilloscapsa** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: North  
*Type from Chipili. Miamba waadland.*

**Euphorbia perplexa** L.C.Leach var. **perplexa**  
**Status:** DD  
Endemism: Endemic?  
Distribution: North  
*Locally camman.*

**Euphorbia platyrrhiza** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: West  
*Grass pon an Kalahari sands. Locally camman.*

**Euphorbia sereti** De Wild. subsp. **variantissima** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: West  
*Type from Kabampa Garge. On rack.*

**Euphorbia whellanii** L.C.Leach  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Known only from type locality.*

**Euphorbia williamsonii** L.C.Leach  
**Status:** DD  
Endemism: Endemic?  
Distribution: North  
*Farms fibrous mats on rocky quartz.*

**Jatropha pachyrrhiza** Radcl.-Sm.  
**Status:** DD

Endemism: Endemic  
Distribution: Central, South  
*Perenniol herb. Widespread, but known from few specimens. Kalahari sand miamba.*

**Monadenium fanshawei** Bally  
**Status:** DD  
Distribution: North, West  
*Alsa known from Tanzania.*  
  
**Phyllanthus friesii** Hutch.  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Known only from the type specimen. Collected by Fries in 1914.*

**Phyllanthus martinii** Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic  
Distribution: West  
*Type from Zambia. Baikiaea thicket (mutemwa), especially an ald drainage lines.*

**Phyllanthus pseudocarunculatus** Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic?  
Distribution: North  
*Known from three specimens from one locality. Not known whether it is endemic to Zambia.*

**Phyllanthus sananei** J.F.Brunel  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Known only from the type locality. Taxonomic confusian as this has been reportedly sunk under Phyllanthus pseudoniruri which is found in Zambia, Zimbabwe and Malawi. P. sananei is known from the specimen Sanane 877 (1969).*

**Phyllanthus tener** Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic?  
Distribution: South  
*Type from Chirundu. Nat known whether it is endemic ta Zambia.*

**Phyllanthus xiphephorus** J.F.Brunel ex Radcl.-Sm.  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Type from Mbala District.*

**Sapium acetosella** Milne-Redh. var. **lineare** Léonard  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Type from Kawambwa. In sandy dambas.*

FABACEAE

**Aeschynomene bracteosa** Baker var. **major** Verdc.  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Known only from the type locality in Kawambwa, collected by Fanshawe (1950s). Area is poorly collected and as a result the species may be mare abundant than what is currently known. Occurs in bushlond.*

**Brachystegia astlei** Hoyle  
**Status:** DD  
Endemism: Endemic  
Distribution: North  
*Only been collected ance in a damba in Kawambwo by Brummitt. Nat a conspicious tree and may have been overlaoked. Known only from the type ond one other collection.*

**Brachystegia michelmoresi** Hoyle  
**Status:** DD

Endemism: Endemic

Distribution: North

*Originally thought to be the same species as B. astelei, but B. michelmorei has bigger leaflets. Known only from the type and one other collection.*

**Crotalaria nudiflora** Polhill

Status: DD

Endemism: Endemic

Distribution: North, West

*The type is from the Luombo River (Kosomo District). Also collected in Kowombwa at several localities.*

*Disturbed grassy places near rivers.*

**Crotalaria polytricha** Polhill

Status: DD

Endemism: Near-endemic?

Distribution: West

*Evergreen thicket. Also known from DRC.*

**Crotalaria tristis** Polhill

Status: DD

Endemism: Endemic

Distribution: North

*Collected at Mbolo twice. This species could be a pioneer species. Secondary miamba (miamba that was under cultivation/disturbed/cut and is recovering).*

**Crotalaria vanmeelii** Wilczek

Status: DD

Endemism: Endemic

Distribution: North

*The species grows in open, disturbed places on sandy soils.*

**Cryptosepalum exfoliatum** De Wild. subsp.

**craspedoneuron** Duvign. & Brenan

Status: DD

Distribution: North

*Wide distribution. Sand and rocky outcrops.*

**Cryptosepalum exfoliatum** De Wild. subsp.

**puberulum** Duvign. & Brenan

Status: DD

Source: IUCN TPC (1981).

**Dalbergia acutifoliolata** Mend.

Status: DD

Source: IUCN TPC (1981)

**Desmodium fulvescens** Schubert

Status: DD

Endemism: Near-endemic?

Distribution: West

*Moist dambas at an altitude of 1,200 m. Recorded from DRC.*

**Dolichos filifolius** Verdc.

Status: DD

Source: IUCN TPC (1981)

**Dolichos magnificus** Verdc.

Status: DD

Source: IUCN TPC (1981)

**Entada bacillaris** F.White var. **plurijuga** Brenan

Status: DD

Endemism: Endemic

Distribution: North

*A shrub up to 2 m tall with small leaves. Found in sandy soil.*

**Entada dolichorachis** Brenan

Status: DD

Endemism: Endemic

Distribution: North

*Very conspicuous and unusual plant, should have been collected more frequently. Collected in Kawambwa by Fanshawe and in Mbala (Lufuba) by Richards. Brachystegia woodland, sandy soils, open riverine situations. Altitude of 780–1,620 m.*

**Humularia submarginalis** Verdc.

Status: DD

Endemism: Endemic

Distribution: North

*Type from Manso. Not particularly well-collected area. Marquesia and Brachystegia woodland, wet woodlands.*

**Indigofera deightonii** Gillett subsp. **rhodesica** Gillett

Status: DD

Source: IUCN TPC (1981).

**Indigofera spathulata** Gillett

Status: DD

Source: IUCN TPC (1981)

**Kotschya imbricata** Verdc.

Status: DD

Endemism: Endemic

Distribution: West

*Collected only once (1969) in Solwezi. This locality is not well-collected. Isengo woodland.*

**Millettia eetveldeana** (Micheli) Hauman

Status: DD

*Found on hoemotite habitats. Possibly more widespread than is currently known.*

**Ophrestia unicastata** (Hermann) Verdc.

Status: DD

Source: IUCN TPC (1981).

**Tephrosia muenzneri** Harms subsp. **pedalis**

Brummitt

Status: DD

Endemism: Endemic

Distribution: East

*Habitat is pink, sandy loam in Brachystegia woodland. Type locality is Lundozi.*

**Tephrosia robinsoniana** Brummitt

Status: DD

Endemism: Endemic?

*On rocky hillsides, at altitudes of 1,340 m. Type collected from Mfuwila (ungazetteered). Possibly known only from the type.*

**Tephrosia zambiana** Brummitt

Status: DD

Endemism: Endemic

Distribution: North

*Type from Mungwi. Area has not been well-collected.*

## FLACOURTIACEAE

**Scolopia stolzii** Gilg & Steumer

Status: DD

*Habitat is riverine forest.*

## GENTIANACEAE

**Farao allata** Taylor

Status: DD

Endemism: Endemic?

*This is the only specimen that is cited in Flora zambesiaca. Collected on a rocky ledge at an altitude of about 1,000 m.*

**Farao minutiflora** P.Taylor

Status: DD

Endemism: Endemic

Distribution: North

*Grows in damp sand amongst rocks. Found at an altitude of 1,260 m.*

**Sebaea africana** Paiva & Nogueira

Status: DD

Endemism: Endemic

Distribution: North

*In damp sandy ground amongst grass at altitude of 1,680 m. Type from the Kawambwa-Mbereshi Road by Richards (1957).*

**Sebaea alata** Paiva & Nogueira

Status: DD

Endemism: Endemic

*Grows in dambas at altitudes of 1,580 m. Type from Shischingo Ranch (collected by Astle). Widespread but not very common.*

**Sebaea caudata** Paiva & Nogueira

Status: DD

Endemism: Endemic

Distribution: South

*Type collected from Mpanaza Mission at Simasunda Damba, 1955. Possibly known only from the type.*

**Sebaea clavata** Paiva & Nogueira

Status: DD

Endemism: Endemic

Distribution: North

*In Brachystegia woodland and in taller robust vegetation. Type on Senga Hill road to Mparakasa (Mbalo). Possibly known only from the type.*

**Sebaea fernandesiana** Paiva & Nogueira

Status: DD

Endemism: Endemic

Distribution: West

*On damp soil on rocky outcrops at an altitude of 1,350 m. Type is from Koleni Hill (6 km north of Kaleni Hill on the Zombezi Rapids). Possibly known only from the type.*

## HYDROPHYLLACEAE

**Hydrolea brevistyla** Verdc.

Status: DD

Endemism: Endemic?

Distribution: North

*At edges of dambos beginning to dry out and also horizontal slobes of sandstone. Easily irrigated by river overflows. Altitude of 1,350 m. Very wide area. Deep blue, conspicuous corolla; plant up to 30 cm tall. Unable to confirm whether it is endemic to Zambia.*

## HYPOXIDACEAE

**Hypoxis cuanzensis** Welw. ex Baker

Status: DD

Endemism: Endemic?

Distribution: North

*Found in a well-collected area. Unable to confirm whether it is endemic to Zambia.*

**Hypoxis filiformis** Baker

Status: DD

Distribution: Central

*Area has been relatively well-collected.*

**Hypoxis rigidula** Baker

Status: DD

Distribution: North

## ILLECEBRACEAE

**Corrigiola paniculata** Peter

Status: DD

## IRIDACEAE

**Dierama longistylum** Marais

Status: DD

Distribution: East

*Found in montane grassland at 600–2,400 m altitude.*

**Lapeirousia zambeziaca** Goldblatt

Status: DD

Distribution: West

*Habitat is boggy grassland (probably seasonally inundated). Type from western Angola. Appears to be endemic to the upper Zambezi.*



## ISOETACEAE

*Isoetes aequinoctialis* Welw. ex A.Br.  
Status: DD

Not sure of its status elsewhere, probably not threatened. Widespread. Type from Nigero.

## LAMIACEAE

*Plectranthastrum cylindricalyx* Mathew  
Status: DD

Source: IUCN TPC (1981).

## LAURACEAE

*Beilschmiedia gilbertii* Robyns & Wilczek var.  
*glabra* Robyns & Wilczek

Status: DD  
Endemism: Near-endemic?

Distribution: NorthWest

Type is from DRC.

## LENTIBULARIACEAE

*Genlisea glandulosissima* R.E.Fr.

Status: DD  
Endemism: Endemic

Distribution: North

Found in permanent wet peaty bogs. Known localities very for oport.

*Genlisea pallida* Fromm-Trinta & P.Taylor

Status: DD

Distribution: West

Permanent wet peat bogs. Also recorded from Angola.

## LYTHRACEAE

*Nesaea purpurascens* Fern.

Status: DD  
Endemism: Endemic

In muddy places near dams. Known only from Zambia. Known only from the type collection.

*Nesaea robinsoniana* Fern.

Status: DD  
Distribution: North

In muddy places. Type collected by Robinson 95 km east of Kasomo. Only known from Zambia.

*Rotala cordipetala* R.E.Fr.

Status: DD  
Distribution: North

In water on sandy ground. Collected from Lake Bangweulu. Possibly also known from Tanzania.

*Rotala dinteri* Koehne

Status: DD  
Endemism: Endemic?

Distribution: West

Habitat in shallow waters of peaty soils in dambos. Type from Mwinilunga, Kolenda Plain (Milne-Redhead). Known only from the type collection.

*Rotala gossweileri* Koehne

Status: DD  
Distribution: West

Found in damp places and shallow water in lateritic dambos. Type is by Eyles from Mfulira on the Copperbelt, Camman habitat. Plant is 3 cm high and easily overlooked. Plants float when area is flooded. Known only from the type collection.

*Rotala juniperina* Fern.

Status: DD  
Endemism: Endemic

Distribution: South

Muddy bottoms of shallow irrigation channels. Type from Kabwula Mwana Dam (by Robinsan).

*Rotala myriophylloides* Welw. ex Hiern

Status: DD  
Endemism: Endemic

Distribution: North

Type from Lake Chilo in Mbolo by Nosh.

*Rotala submersa* Pohnert var. *angustipetala* Fern.

Status: DD  
Endemism: Endemic

Distribution: North

Ecology known from the type variety. Type locality in Mbolo.

## MALPIGHIACEAE

*Triaspis lateriflora* Oliv.

Status: DD  
Distribution: North

Climber on small trees in bushes and forest margins.

Type is from Angola. Probably widely distributed.

## MELASTOMATACEAE

*Cinnobotritys acaulis* (Cogn.) Gilg

Status: DD  
Endemism: Endemic

Distribution: West

Found on damp mossy rocks in dense evergreen shade vegetation. Known only from the type locality.

*Dichaetanthera rhodesiensis* A. & R.Fern.

Status: DD  
Distribution: North, West, Barotseland

Known from lateritic soils and rocky tops of hills. Wide distribution.

*Dissotis caloneura* Engl. var. *pilosa* A. & R.Fern.

Status: DD  
Endemism: Endemic

Distribution: North

Found in exposed situations in quartzite and sandstone rocks. Type from Luanshe on the Copperbelt by Fanshowe. Shrub or small tree up to 3.5 m tall. The two known localities are for oport.

*Dissotis debilis* (Sond.) Triana var. *pedicellata* A. & R.Fern.

Status: DD  
Endemism: Endemic?

Distribution: North

Type is from Mpulungu on Lake Tongonyiko in open marshy localities amongst grass. Unable to confirm whether it is endemic to Zambia.

*Dissotis glandulosa* A. & R.Fern.

Status: DD  
Endemism: Endemic

Distribution: West

The type is from Mwinilunga by Robinson at the source of the Zambezi. It is possibly known only from the type.

## MELIACEAE

*Entandrophragma deleuyi* De Wild.

Status: DD  
Distribution: Central, South

It is a dry evergreen thicket canopy species. Its habitat is threatened. Found in high and medium rainfall areas. Although of inferior quality, wood is used for furniture.

## MENYANTHACEAE

*Nymphoides milnei* A.Raynal

Status: DD  
Endemism: Endemic?

Distribution: West

Type is from Matonchi Farm collected in the 1930s.

Found in a temporary pool. Small aquatic herb.

## MORACEAE

*Ficus ardisioides* Warb.

Status: DD  
Distribution: West

## MYRSINACEAE

*Anagallis rhodesica* R.E.Fr.

Status: DD  
Endemism: Endemic

Distribution: North

Apparently known only from the type which is from Koli between Monso and Bongweulu. In seasonally flooded places.

## OLEACEAE

*Chionanthus niloticus* (Oliv.) Stearn

Status: DD  
Distribution: North

It grows in riparian bushy (moist evergreen forest, swamp forest). Its habitat is common and widespread.

## ORCHIDACEAE

*Angraecopsis gassneri* G.Will.

Status: DD  
Endemism: Endemic

Distribution: West

Known only from the type collection. Grows on trees and granite rocks in deep moss at 1,300 m. Probably overlooked, as it is a small plant.

*Angraecum geniculatum* G.Will.

Status: DD  
Endemism: Endemic

Distribution: West

Species is epiphytic and grows in dense fringing forest. Only a single specimen citation is given in Flora zambesiaca. No locality is given. Probably overlooked, as it is a small plant.

*Brachycorythis mixta* Summerh.

Status: DD  
Endemism: Near-endemic?

Distribution: West

Dambos and seasonally wet upland grassland. Type from Angola.

*Disa caffra* Bolus

Status: DD  
Distribution: West

Occurs in wet grassland, usually in dambos at an altitude of 1,400–1,700 m. It is said to be rare in swampy areas in the Flora of southern Africa region.

*Disa cryptantha* Summerh.

Status: DD  
Distribution: Central, West

Found growing in marshy grasslands or dambos. Altitude of 1,000–1,800 m. It is widespread although the species is rare.

*Disa verdickii* De Wild.

Status: DD  
Distribution: West

Found in wet sandy grassland or in Brachystegia and Uapaca woodland and submontane grasslands. Could be widespread.

*Disperis brevifolia* Verdc.

Status: DD  
Endemism: Near-endemic

Distribution: Central, West

Habitat is Brachystegia woodland and open dambos usually in shallow soils over rocks. Altitude of 1,200–2,340 m. Probably not used as chikando, as the tuber is 7 mm long. Possibly overlooked, as it is a small plant. Also known from Malawi.

*Disperis katangensis* Summerh. var. *minor* Verdc.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: West  
 Found in Cryptosepalum woodland on sand. Altitude about 1,400 m. Probably overlooked.

*Eulophia holubii* Rolfe  
**Status:** DD  
 Distribution: Barotseland  
 Well-represented outside Zambia.

*Eulophia richardsiae* P.J.Cribb & la Croix  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North  
 Found in Brachystegia woodland at 1,500 m. The species apparently forms colonies where it grows. Probably overlooked, only appears when flowering, otherwise it is subterranean. Known only from the type, collected by Richards 10043 (1957).

*Eulophia saxicola* P.J.Cribb & G.Will.  
**Status:** DD  
 Distribution: Central  
 Also recorded from Zimbabwe.

*Habenaria macrotidion* Summerh.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North  
 The type is Mbereshi which is poorly collected. Known from swampy ground. Probably used as chikanda.

*Habenaria orthocentron* P.J.Cribb  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North  
 Very wet swamp forest. Probably used as chikanda.

*Liparis molendinacea* G.Will.  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: North  
 Habitat is swamp forest in humus on the forest floor. Has pseudobulbs so probably not used. Swamp forests tend not to be collected. Not a densely populated area.

*Nervilia kotschyi* (Rchb.f.) Schltr. var. *purpurata* (Rchb.f. & Sond.) B.Pettersson  
**Status:** DD  
 Distribution: Barotseland  
 Widespread in Africa. Not harvested.

*Nervilia renschiana* (Rchb.f.) Schltr.  
**Status:** DD  
 Distribution: South  
 Brachystegia woodland and riverine forest fringes, often on termite mounds. Not harvested.

*Platycoryne trilobata* Summerh.  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: Central  
 Type from Chokwenga headwaters. Known only from Lusoko. Not known whether it is endemic to Zambia.

*Polystachya asper* P.J.Cribb & Podzorski  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: West  
 Evergreen fringing forest in dense shade. Known only from north of Mwinilungo. Narrow distribution. Possibly also in DRC.

*Polystachya erythrocephala* Summerh.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: West  
 Collected on rocks in deep gorge near a river. The type is from Solwezi, collected by Milne-Redhead. Narrow endemic, probably overlooked as it is a small plant.

*Polystachya mafingensis* P.J.Cribb  
**Status:** DD  
 Endemism: Near-endemic  
 Distribution: North  
 Submontane mist zone woodland and grassland, often epiphytic on trees and shrubs. Altitude of 2,240 m. The species is known only from Malawi and Zambia, from the Mofingos. Probably overlooked as it is a small plant.

*Polystachya moreauae* P.J.Cribb & Podzorski  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North  
 It is so far known only from the rivers of the Muchingo Escarpment. Narrow endemic.

*Pteroglossaspis corymbosa* G.Will.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: West  
 Habitat is wet open grassland. Known only from the type locality.

*Tridactyle translucens* Summerh.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: West  
 Habitat is epiphytic in Cryptosepalum and Brachystegia woodland. This species is known only from Mwinilungo, just east of the Kosompe River. Probably overlooked but a narrow endemic.

## OXALIDACEAE

*Oxalis abercornensis* Knuth  
**Status:** DD  
 Distribution: North  
 Only known from the type at the Zambia-Tanzania border. Collected in 1936. Along paths and on a garden weed. Possibly a form of *Oxalis oligotricha* (Richards collected this species about four times). Sounds like it is a familiar weed, but this needs confirmation.

## PASSIFLORACEAE

*Basananthe baumii* (Harms) De Wilde var. *baumii*  
**Status:** DD  
 Endemism: Near-endemic?  
 Distribution: North  
 Habitat is dry secondary forest, woodland and scrub on dry sandy soils. Probably just overlooked and undercollected. Apparently known to occur in Angola.

## PERIPLOCACEAE

*Pentagonanthus grandiflorus* (N.E.Br.) Bull. subsp. *grandiflorus*  
**Status:** DD  
 Source: IUCN TPC (1981).

## POACEAE

*Brachyachne simonii* Kupicha & Cope  
**Status:** DD  
 Endemism: Endemic  
 Distribution: West  
 Found in laterite pans. Type is from Chizelo (Mfumbu District) at 1,130 m. Narrow distribution range.

*Digitaria calcarata* Clayton  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: North  
 On shallow soil overlying rocks.

*Digitaria minoriflora* Goetgh.  
**Status:** DD  
 Endemism: Endemic

Distribution: North  
 Found in grassland in sandy soil along roadsides.

*Digitaria procurrens* Goetgh.  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North  
 Known only from the type collection. Found along the roadside in moteshe thicket (altitude of 1,200 m).

*Digitaria sacculata* Clayton  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North  
 Known only from the type collection in damp sand.

*Diheteropogon microterus* Clayton  
**Status:** DD  
 Endemism: Endemic  
 Distribution: North

*Eragrostis astreptoclada* Cope  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: North  
 The habitat is damp sand or banks along river and sandy edges of peaty dombos. Altitude of 1,400–1,560 m.

*Loxodera bovonei* (Chiov.) Launert  
**Status:** DD  
 Source: IUCN TPC (1981).

*Panicum perangustatum* Renvoize  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: North  
 Seasonally wet places. Type is from Misomfu. Not known whether it is endemic to Zambia.

*Panicum phippisii* Renvoize  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: North  
 Dense scrub in shade. Altitude of 1,350 m. Type from Mporakoso. Not known whether it is endemic to Zambia.

## PODOSTEMACEAE

*Leiothylax drummondii* C.Cusset  
**Status:** DD  
 Endemism: Endemic  
 Distribution: Central  
 Grows submerged in fast-flowing water, such as fast-flowing rivers associated with granite and in hydroelectric plant canals. Constitutes a problem where it is difficult to eradicate, possibly a problem plant. Type from Copiri-Monkoshi Raad.

## POLYGONACEAE

*Oxygonum carnosum* Grah.  
**Status:** DD  
 Source: IUCN TPC (1981).

*Oxygonum litorale* Grah.  
**Status:** DD  
 Source: IUCN TPC (1981).

## PROTEACEAE

*Protea poggei* Engl. subsp. *mwinilungensis*  
**Status:** DD  
 Endemism: Endemic?  
 Distribution: West  
 One collection cited in Flora zambesiaca from Mwinilungo.



PTERIDACEAE

*Ceratopteris cornuta* (Beauv.) Le Prieur  
Status: DD

Has a disjunct distribution and known from only a few localities in Zambia. Widespread in Tropical Africa to Senegal; also in Sudan, Madagascar, Sacatro, Saudi Arabi and sa farth.

ROSACEAE

*Hagenia abyssinica* (Bruce) J.F.Gmel.  
Status: DD

Distribution: East  
Aframontane species. Fringing upland roinfarest, deciduous woodland and evergreen bushland. On Zambia-Nyika Plateau and possibly also from Mbala.

RUBIACEAE

*Amphiasma redheadii* Bremek.  
Status: DD

Endemism: Endemic  
Distribution: West  
Type from Mwinilunga, by Milne-Redhead (1930) on the Warmibaba River (ungozetteered). Known only from the type. Found in Brachystegia woodland.

*Fadogia luangwae* Verdc.  
Status: DD

Endemism: Endemic  
Distribution: East  
Hill miomba woodland (different to escorpmnt woodland, thin sails, edaphically interesting). Altitude 800 m. Habitat is widespread. Type is from North Luangwa Natianol Pork. Known only from the type (P.P. Smith 0220).

*Fadogia tomentosa* De Wild. var. *flaviflora* (Robyns) Verdc.  
Status: DD

Distribution: Central, Barotseland, West  
Brachystegia woodland on Kalahari sand. Tree of 1.5 m tall. Also recorded in Angola.

*Geophila* sp. Fanshawe 6855  
Status: DD

Endemism: Endemic?  
Distribution: West  
Only a single specimen by Fanshawe from Ndalo (1962). Found in dry evergreen forest at altitude of 1,370 m. Has yellow flowers. Similar to *G. afzelii*.

*Halea rubrostipulata* (K.Schum.) Leroy  
Status: DD

Locally called 'mupa' (Bemba name). Alternative genus name: *Metrogyna*.

*Oldenlandia corymbosa* L.  
Status: DD

Endemism: Endemic  
Distribution: North  
Sandy ground, oltitude 1,200 m. Originally colled *Oldenlandia linearis*. Apparently known only from the type that was collected by Richards.

*Oldenlandia robinsonii* Verdc.  
Status: DD

Endemism: Endemic  
Distribution: West  
In lateritic gravel.

*Pachystigma albosetulosum* Verdc.  
Status: DD

Endemism: Endemic  
Distribution: North, Baratseland  
Found in grossy plains near patches of woadlond. Type is from Kolamba.

*Pachystigma micropyren* Verdc.  
Status: DD

Distribution: West  
Brachystegia woodland, sometimes an laterite outcrops. Unusual distribution. Also recorded in Angola.

*Pavetta pygmaea* Bremek.  
Status: DD

Endemism: Endemic?  
Distribution: West  
Cryptosepalum woodland on sand. Altitude  $\pm 1,000$  m. Type is from Mwinilunga District, west of Dabeka Bridge. Not known whether it is endemic to Zambia.

*Psychotria pumila* Hiern var. *subumbellata* (Petit) Verdc.

Status: DD  
Endemism: Endemic  
Distribution: North  
Riparian thicket. Type from Kawombwa District, collected by Fanshawe 3877 (1962). Known only from the type.

*Rytigynia* sp. Angus 604  
Status: DD

Endemism: Endemic  
Distribution: West  
Species known only from a single collection, Angus 604 (1952). Mavunda on Kalahari sand. Mavunda is (Cryptosepalum) dry evergreen thicket ar forest which is a mosaic. The type is from Mwinilunga District.

*Rytigynia* sp. Fanshawe 2998  
Status: DD

Distribution: West  
Known only from a single collection, Fanshawe 2998 (1957). Collected on a granite boulder in evergreen thicket (mateshe thicket). One collection in Chingala.

*Sarcocephalus pobeguini* Pobéguin ex Pellegrin  
Status: DD

Distribution: North, West  
Habitat in gallery forest on well-drained sandy sail but probably periodically flooded. Distributed ocrass the top half of the cauntry. Up to 22 m tall. Has capitulate inflorescences. Not known whether it is endemic ta Zambia.

*Spermacoe princeae* (K.Schum.) Verdc. var. *mwinilungae* Verdc.

Status: DD  
Endemism: Endemic  
Distribution: West  
Found in riverine forest, altitude of 1,300 m. Collected ance on the West Lunga River by Brummitt, Chisumpo and Polhill (1975).

*Spermacoe samfya* Verdc.

Status: DD  
Endemism: Endemic  
Seasonally flaaed flats. Type collected from Mukasa (ungazetteered) by Chabwelo (1970).

*Tapiphyllum cinerascens* (Hiern) Robyns var. *cinerascens*

Status: DD  
Endemism: Endemic?  
Distribution: West  
Cryptosepalum woodland, altitude of 1,350 m. Collected from Mwinilunga (1969). Apparently also known from Tanzania.

*Tapiphyllum cistifolium* (Welw.) Robyns var. *latifolia* Verdc.

Status: DD  
Distribution: West  
Uapaca woodland, altitude of 1,250 m. Type from Mwinilunga (1975). Is a suffrutex.

*Vangueria volkensii* K.Schum. var. *kyimbilensis* (Robyns) Verdc.

Status: DD  
Distribution: East  
In the mid-stratum of evergreen farests near streams. Type from Tanzoniá. Taxonomy may need attention.

RUTACEAE

*Vepris fanshawei* Mendonça  
Status: DD

Endemism: Endemic  
Distribution: North  
Known only from the type taken from Chiengi, collected in 1958.

*Vepris whitei* Mendonça  
Status: DD

Distribution: North  
In evergreen riverine forest. Possibly in the Itigi thicket area. Type is from Mweru Wantipa. The fruits ore orange-yellow and sweet-tasting. Widespread.

SCROPHULARIACEAE

*Buchnera arenicola* R.E.Fr.  
Status: DD

Endemism: Endemic  
Distribution: North  
Known only from the cited collection (1911) in Flara zambesiaca. The habitat is under severe threat from fisheries.

*Buchnera crassifolia* Engl.  
Status: DD

Distribution: North  
Only a single cited specimen far Zambia. Also known from Malawi.

*Buchnera nitida* Skan  
Status: DD

Distribution: North  
Also known from Malawi.

*Buchnera pulcherrima* R.E.Fr.  
Status: DD

Endemism: Endemic  
Distribution: North  
Known only from the type collection (1911). Na actual site given.

*Craterostigma plantagineum* Hochst.  
Status: DD

Distribution: North  
Medicinal plant. Widespread at altitudes of 1,500–2,000 m. Could be a casmpalitan weed but this cannot be confirmed.

*Limnophila crassifolia* Philcox  
Status: DD

Endemism: Endemic?  
Distribution: West  
Type from Mwinilunga. Muddy riversides. Only 6 cm toll and probably easily averlaoked.

*Selago thyrsoidea* Baker var. *thyrsoidea*  
Status: DD

Endemism: Near-endemic?  
Distribution: East  
Type from Malawi-Nyika.

STERCULIACEAE

*Dombeya brachystemma* Milne-Redh.  
Status: DD

Distribution: West, South  
Very wide distribution range.

TILIACEAE

*Triumfetta grandistipulata* Wild  
Status: DD

Sandy flots in scrubby woadlond. Type from Kawanga (ungazetteered), by Fanshawe.

*Triumfetta reticulata* Wild

Status: DD

Distribution: West

In waste places and woodlands. Type is from Ndala by Fanshawe. Not known whether this is a weed. Requires verification.

## URTICACEAE

*Pouzolzia bracteosa* Friis

Status: DD

Endemism: Endemic?

Distribution: Central/East

On alluvium near river areas. Collected only once in Luangwa Valley (1972). Probably related to *Pouzolzia fadenii* from the Kenyan coast. Locality is well-

collected. Only 5 cm tall. Not known whether it is endemic to Zambia.

## VERBENACEAE

*Clerodendrum sansibarense* Gürke subsp. *sansibarense*

Status: DD

Endemism: Endemic?

Distribution: North

The habitat is dry evergreen forests (secondary forest).

The species is widespread in high rainfall areas.

## VITACEAE

*Cyphostemma nanellum* (Gilg & R.E.Fr.) Descouings ex Wild & R.B.Drumm.

Status: DD

Endemism: Endemic

Distribution: North

Found in burnt woodland. Known only from the type specimen.

*Cyphostemma tenuissimum* (Gilg & R.E.Fr.)

Descouings ex Wild & R.B.Drumm.

Status: DD

Endemism: Endemic

Distribution: North

Found on a rocky ground. Known only from the type collected in 1911.



The tubers of edible orchids that are harvested for consumption are called *chikanda* or African polony in Zambia. (Photo: M.G. Bingham)



*Satyrium buchananii*, used as *chikanda*. (Photo: G. Williamson)



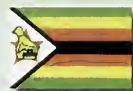
*Brachycorythis angolensis*, a dambo species used for *chikanda*. (Photo: G. Williamson)



Dambo areas are impacted by human disturbance in Zambia. (Photo: G. Williamson)



# Zimbabwe



Anthony Mapaura\* & Jonathan R. Timberlake†

## Introduction

The flora of Zimbabwe, comprising around 4,500 species of vascular plants, is comparatively well-studied. Nevertheless, a comprehensive checklist and distribution maps for other than a few species are not yet available. This has made the compilation of a national plant Red Data List (RDL) difficult, as the conservation status of most species in the country is poorly documented. On the other hand, Zimbabwe has much botanical expertise and the RDL compilation process has drawn from this pool.

Indeed, the first attempt at listing species under threat was probably undertaken by Wild & Müller (1979) who mentioned 44 species as *Endangered* or *Vulnerable* and an additional 40 species as *Rare* (old IUCN categories). Threatened and protected species were discussed by Kimberley (1992), while a number of vegetation studies of smaller areas have documented species of particular interest or concern (for example, Timberlake *et al.* 1991, Timberlake & Mapaura 1992, Timberlake & Musokonyi 1994, Timberlake *et al.* 1998, and Drummond in Cunliffe 2000). Conservation of vegetation has been addressed by Wild (1968), Robertson (1986), Timberlake *et al.* (1991), and Timberlake & Müller (1994), amongst others.



Participants at the RDL Workshop held in Harare.

(Photo: J.S. Golding)

Major areas of endemism in Zimbabwe are the Chimanimani Mountains and the grasslands of the Great Dyke, both of which have been documented by Wild (1964, 1965). Moreover, many of Zimbabwe's threatened species are found in patches of moist forest of the Eastern Highlands and were found in the course of detailed field surveys (see Müller 1994a, 1999). More recently, attempts have been made by WWF to document and map threatened and endemic plant species for the miombo ecoregion (Gibson 1999, Mugodo 1999). Worldwide studies done by the IUCN and WCMC (Walter & Gillett 1998, Oldfield *et al.* 1998) also served as building blocks for this RDL compilation.

## Methods

A SABONET workshop was held at the National Herbarium in Harare (16–21 October 2000) to discuss and assess the species on a list drawn up in advance. Data were collected from various sources, including herbarium specimens, literature (primarily *Flora zambesiaca*), and personal communications. Additional taxa were assessed and verification continued up until the present publication of results. Persons involved are listed in the Acknowledgements.

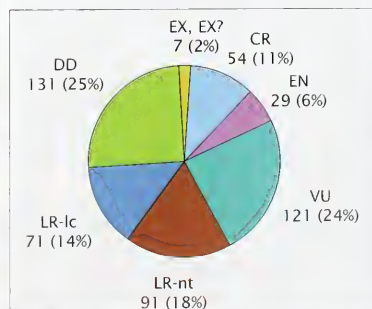


Figure 1. Summary of the number of taxa in the different IUCN categories.

**Capital:** Harare, largest city

**Area:** 390,759 km<sup>2</sup>

**Languages:** English (official), Shona, Ndebele

**Currency:** Zimbabwean dollar (Z\$)

**Total plant species:** 4,440

**Total plant endemics:** 214

**Total RDL plants:** 504

**Focal RDL institution:** SRGH

**Number of Protected Areas:** 12 National Parks, 1 Transfrontier Park (Mozambique–South Africa–Zimbabwe), and numerous other protected areas.

**Population:** 11,903,700 **Growth Rate:** 1.8% **Density:** 29.6 people/km<sup>2</sup>

**Phytogeography:** Mostly Zambezi-an, with Afromontane elements in the Eastern Highlands.

**Flora:** Dry miombo woodland, with mopane woodland and other woodland types dominating. Serpentine grasslands are found in the Great Dyke. Montane forest interspersed amongst high-altitude grasslands and heath is found in the Eastern Highlands.

**Sources:** Anonymous 2000, Stuart & Adams 1990, Timberlake & Müller 1994

\*National Herbarium, Harare, Zimbabwe

†Biodiversity Foundation for Africa, Bulawayo, Harare, Zimbabwe

## Assumptions

Various assumptions were made in allocating RDL categories, as in many cases data were insufficient for definitive categorisation.

*Critically Endangered* (CR) was used for species known only from very few indi-

viduals (<50) in forests.

*Vulnerable* (VU D2) was applied whenever a species had a limited distribution (fewer than five localities), not excessively low numbers of individuals, and there was no suggestion of declining status (numbers or habitat) or apparent threat, for example, species confined to Chirinda Forest or to the Lower Rusitu. These areas are well-pro-

tected and there is no evidence of major change in habitat. Also classified as VU D2 were species known only from the type specimen.

Chimanimani quartzite grassland endemics (Zimbabwe/Mozambique) were all classified as *Lower-Risk near threatened* (LR-nt), as they occur over a comparatively large area that is wellprotected and there is no evidence of change in conservation status. If a species is restricted to the peaks or marginal habitats, it was classified as VU D2.

Great Dyke endemics are spread over a large area, but are not particularly well-protected. They were all classified as *Lower-Risk least concern* (LR-lc), unless restricted to particular parts of the Dyke or known to be localised or rare, in which case they were classified as LR-nt or VUD2.

Species thought to be endemic to Zimbabwe, whatever their status, were given a threatened category, even if very low (for example, LR-lc). Otherwise only species that are threatened with extinction, even remotely, were given a category. Thus, species that show marked population decline, but which are very common and widespread, were regarded as not threatened and subsequently removed from the RDL.

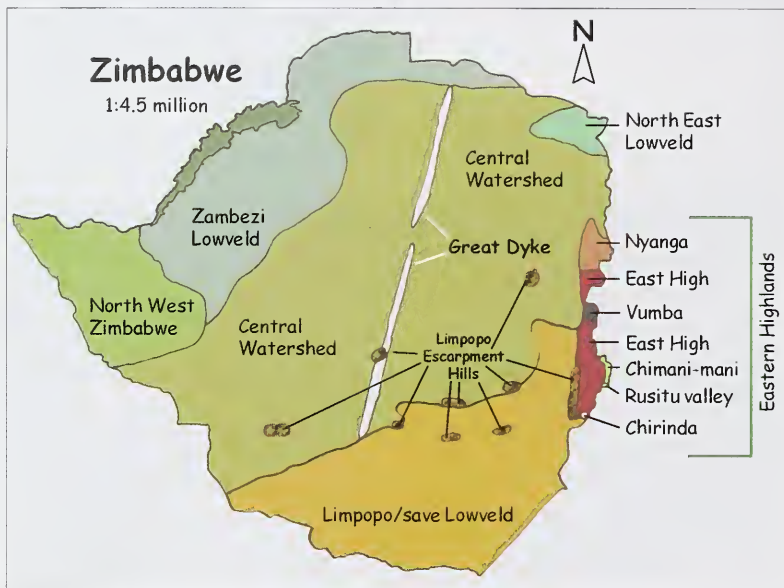
Utilised species were evaluated on the basis of their biological status, not their utilisation status (which may or may not be threatened).

## Geographical Areas and Habitats

The geographical areas used in this RDL (Table 1) were determined using ecological and geographical criteria, and emphasised areas of known endemism, richness or threat. The habitat categorisation (Table 2) broadly followed physiognomy and moisture regime.

## Results

A total of 504 plant species and infraspecific taxa were assessed and are presented here (Table 3). Of the assessed species, 224 are endemic or near-endemic, representing 44.4% of the entire RDL. Of these species, 71 are in a significant threat category (CR, EN or VU) (Figure 1). An analysis of Zimbabwean endemic species is being carried out and will be presented later (A. Mapaura, in prep.).



Geographical areas used in Zimbabwe RDL.

Table 1. Geographical areas of Zimbabwe used in the RDL.

Geographical area	Areas covered
Chimanimani	Mountains and immediate area.
Rusitu Valley	Haroni, Rusitu, and Makurupini forests.
Nyanga	Mountains, grasslands, forests, Honde Valley, and adjacent uplands.
Vumba	Mountains, grasslands, and forests.
Eastern Highlands	Mountains/uplands incorporating two or more of above. Also Himalaya and Stapleford.
Limpopo Escarpment	Roughly defined escarpment rising from Limpopo Valley, especially hills catching moist air, e.g. Matobo, Wedza, Bikita, Great Zimbabwe, Chipinge Uplands, Nyoni Hills.
Limpopo/Save Lowveld	Most of area below 900 m, including Gonarezhou National Park.
Northwestern Zimbabwe	Victoria Falls, Kazungula, Hwange National Park, Matetsi, western part of Kalahari sands, and area west of the Gwayi River.
Zambezi Lowveld	Most of area below 900 m, including Zambezi Escarpment, Kariba, Binga, and Sebungwe up to Gwayi River.
Northeastern Lowveld	Mazoe River Valley, Mudzi, and Rushinga.
Great Dyke	Grasslands and associated woodlands; north and south sections.
Chirinda	Chirinda forest and outliers.
Central Watershed	Central highveld backbone of country above 900 m, running from Plumtree, through Bulawayo, Gweru, and Kadoma to Harare; north to Karoi-Centenary-Bindura; east to Mutare/Nyanga; south to Chivhu/Masvingo
Widespread	More than three areas mentioned above.



**Table 2. Habitats used in the RDL.**

Habitat	Description
Moist forest (MF)	Rainforest (moist or dry), thick riparian woodland/forest. Mention if species is epiphyte (EPI).
Dry forest (DF)	Deciduous forest, thicket, and dry riparian woodland.
Moist woodland (MW)	Forest margins, kloof forest, miombo woodland—rainfall above 650 mm p.a.
Dry woodland (DW)	<i>Acacia</i> , <i>Combretum</i> , <i>Terminalia</i> , mopane woodlands—rainfall below 650 mm p.a.
Rocky (RH)	Bare rock, rocky slopes, rocky outcrops and stony ground.
Dambo (DM)	Seasonally waterlogged grasslands, mostly on the highveld.
Grassland (GR)	Upland grassland, often amidst boulders, edaphic grasslands; qualified by quartzite (Chimanimani) or serpentine (Great Dyke).
Wetland (WET)	Seasonally flooded areas, including very wet dambos and seeps.
Disturbed (DIST)	Disturbed land, usually resulting from agriculture.

A total of 88 families are represented in the RDL, with 55% of the species in nine families (Table 4); the Orchidaceae has by far the largest number of RDL taxa. Euphorbiaceae, Aloaceae, Asclepiadeae, Orchidaceae, and Asteraceae are mainly under threat from collectors for gardens and horticulture.

#### Areas and Habitats

The distribution of listed plants is not even across the country (Table 5). There is a high number on the Chimanimani Mountains (nearly all of which are quartzite grassland endemics, and very few of which are threatened), on the hills of the Limpopo Escarpment, in the forests and grasslands of the Eastern Highlands, and in the forests of the Rusitu Valley and Chirinda. The latter two areas cover less than 10 km<sup>2</sup> in total, yet species confined to one or the other within Zimbabwe account for 54 of the threatened species (25.5%). These areas should obviously be major conservation targets. A high number of taxa is found on the extensive Central Watershed, the most populated area of the country. Most threatened species here are found in dambos and moist grasslands. Almost all listed taxa found on the Great Dyke are endemic to Zimbabwe, but none are particularly under threat. The Limpopo Escarpment Hills, which are very limited in extent, support a number of particularly threatened species.

Table 6 shows the habitats of all the RDL species. Moist forest is the habitat with the highest number of threatened taxa (94 taxa or 27.3% of the total); this habitat covers less than 106 km<sup>2</sup> throughout the Eastern Highlands (Müller 1999). Grasslands (mostly submontane grasslands in Nyanga and Chimanimani, and those of the Great

Dyke) and dambos are also of limited extent across the country, yet these habitats support a high number of RDL taxa. The majority of the country's endemics are confined to quartzite or mineral-toxic grasslands. Dambos on the central watershed are a particularly threatened habitat owing to cultivation, drainage, and urban expansion. Many of the listed taxa from moist woodland are actually forest-edge taxa.

#### Discussion

This List has seen a great increase in numbers of both assessed and threatened taxa compared to that of Walter & Gillett (1998). This increase can be attributed to the fact that the present RDL is the result of much wider consultation and better consolidation of existing information. We must, none the less, keep in mind that the increase in numbers may also reflect the state of biodiversity conservation in Zimbabwe.

The forests of the Eastern Highlands harbour 44% of the species on this RDL, mainly because these forests form a unique habitat in the country and occupy a relatively small area. It is heartening to note that a substantial part of the forests are protected within the National Parks estate. Major threats to forest species are collectors, afforestation, and land conversion to agriculture. The greatest threat facing species on the RDL in general, however, is loss of habitat due to human activities such as mining, damming, and urban expansion. It is, nevertheless, still within our capacity to control and mitigate these factors.

There appears, moreover, to be a disproportionate representation on the List of succulents and orchids. This is probably

**Table 3. Summary of the Zimbabwe RDL.**

Category	Number of taxa
Taxa on RDL	504
Genera	257
Families	84
Endemic/near endemic taxa	224
Strict endemic taxa	178
Threatened taxa (EX, CR, EN, VU)	211
Lower Risk taxa (LR-nt, LR-lc)	162
Extinct (EX)	7
Critically Endangered (CR)	54
Endangered (EN)	29
Vulnerable (VU)	121
Lower-Risk near threatened (LR-nt)	91
Lower-Risk least concern (LR-lc)	71
Data Deficient (DD)	131

**Table 4. Families with 10 or more RDL species.**

Family	Number of taxa
Orchidaceae	72
Apocynaceae <i>sensu lato</i>	46
Euphorbiaceae	41
Fabaceae	33
Rubiaceae	25
Asteraceae	23
Acanthaceae	21
Scrophulariaceae	18
Aloaceae	17

due to our greater knowledge of these groups, as well as the perceived threat from collectors. These figures do not necessarily imply that these groups are indeed more under threat than other life forms or taxa. Clarification of many outstanding questions such as this can only be resolved by further field studies.

In addition, there are 224 endemics on the list. Zimbabwe therefore has not only a national responsibility to conserve these species, but also a global responsibility, although it is possible that some species may also occur in neighbouring countries. It would be a pity if these species were lost due to negligence and lack of enforcement of existing laws.

Finally, it should be noted that there are probably more threatened species in Zimbabwe than what is presented here. Field

**Table 5. Distribution of listed taxa by geographical area (Total exceeds list number owing to presence of some taxa in two or more areas).**

Area	Number of listed taxa	Number of threatened taxa (CR, EN & VU)	Percentage of total threatened taxa
Chimanimani	79	25	11.8
Nyanga	43	19	9
Vumba	12	7	3.3
Chirinda	31	25	11.8
Eastern Highlands*	214	94	44.3
Central Watershed	70	14	6.6
Great Dyke	30	8	3.8
Limpopo Escarpment Hills	40	20	9.4
Rusitu Valley	59	48	22.6
Limpopo/Save Lowveld	61	29	13.7
Northwestern Zimbabwe	18	9	4.2
Zambezi Lowveld	22	8	3.8
North Eastern Lowveld	2	1	0.5
Unspecified	27	3	1.4
Widespread	8	1	0.5

\*Number of taxa noted for Eastern Highlands includes taxa limited to Chimanimani, Nyanga, Vumba, and Chirinda, as well as more widespread upland taxa.

**Table 6. Habitats of RDL taxa (Total taxa exceed list number owing to presence of some in two or more habitats).**

Habitat	Number of listed taxa	Number of threatened taxa (CR, EN & VU)	Percentage of total threatened taxa
Moist forest	138	94	44.3
Dry forest	12	6	2.8
Moist woodland	41	25	11.8
Dry woodland	64	22	10.4
Rock and outcrops	31	14	6.6
Grassland	130	37	17.5
Dambos	24	2	0.9
Wetland	13	3	1.4
Disturbed	1	1	0.5
Unknown	65	12	5.7

**Table 7. Endemism on the RDL for Zimbabwe.**

Endemism	Number of taxa
Confirmed endemic	178
Suspected endemic	9
Confirmed near-endemic	27
Suspected near-endemic	10
<b>TOTAL</b>	<b>224</b>

surveys should be organised to verify species categorised as *Data Deficient* (DD) and others. The high number of DD taxa is an indicator of the future efforts required to resolve these issues, as some could well be categorised as *Critically Endangered*.

Zimbabwe has satisfactory legislation concerning the conservation of the environment, but more can still be done especially in enforcing these laws, educating people, and setting priorities for conservation. We hope that this list will generate much interest in the gathering and interpretation of data so that our conservation strategies can be improved.

**Acknowledgements** We would like to extend our sincere thanks to the following individuals: R. Archer (succulents, Celastraceae and Orchidaceae), K. Balkwill (Acanthaceae), J. Burrows (pteridophytes), T. Cope (Poaceae), P. Cribb (Orchidaceae), D. Bridson (Rubiaceae), A. Ellert (succulents), M. Ellert (succulents, cucurbits), D. Goyder (Asclepiadaceae), P. Hoffmann (Euphorbiaceae), S. Holmes (Euphorbiaceae), I. la Croix (Orchidaceae), A. Paton (Lamiaceae), D. Plowes (succulents and Orchidaceae), K. Roux (pteridophytes), B. Schrire (Leguminosae), and K. Vollesen (Acanthaceae). The following persons attended the SABONET Red Data List workshop in Harare: C. Chapano, S. Childes, M. Coates-Palgrave, R.B. Drummond, W. Fibeck, J.S. Golding, M. Kimberley, A. Mapaura, C. Mujaju, T. Müller, M. Mushongahande, V. Phiri, F. Robertson, and J.R. Timberlake. R.B. Drummond, T. Müller, and M. Coates-Palgrave are especially acknowledged for their help in the compilation of this Red Data List.



Alpine pool on Mount Inyangani, showing *Cyrtanthus brevifolius*. (Photo: J. Timberlake)



# EXTINCT & THREATENED

## ACANTHACEAE

### *Brachystephanus africanus* S.Moore

Status: CR B1B2c

Threats: Collection

Distribution: Chimanimani

Site: Mermaids Grotto

Habitat: Moist forest

There is a possibility that the area has become cleared and the plants are gone. Grows in rocky area.

Threatened by horticultural collectors.

### *Peristrophe serpenticola* K.Balkwill & Campb.-Young

Status: VU D2

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Nyamunyech (Grassland), Vanad Pass

Habitat: Grassland—Serpentine

On termite mounds. Serpentine soils. Only five specimens in SRGH. Was last collected in 1978. It is said to be more common than herbarium collections suggest.

### *Sclerchiton kirkii* C.B.Cl.

Status: EN C2a

Threats: Habitat degradation

Distribution: Rusitu Valley

Site: Haroni-Makurupini

Habitat: Moist forest

Marginal ecotonal forest species. Scattered habitats which are threatened.

## ALANGIACEAE

### *Alangium chinense* (Lour.) Harms

Status: CR B1B2eD

Distribution: Nyanga, Chirinda

Site: Mutarazi Falls, Chirinda forest

Habitat: Moist forest

Known from two localities from the late 1970s. The subpopulation at Mutarazi Falls has only two mature individuals; the subpopulation in Chirinda Forest has about seven young individuals. Field surveys were unsuccessful at rediscovering them.

## ALOACEAE

### *Aloe ballii* Reynolds var. *ballii*

Status: VU D2

Endemism: Endemic

Threats: Collection

Distribution: Chimanimani

Site: Haroni Gorge, confluence of Haroni and Chisengu River, Chimanimani

Habitat: Rocky/Grassland—Quartzite

Occurs only at an altitude of about 500 m in the Haroni River Gorge and a short distance from the gorge at the southern end of the mountain. Inaccessible habitat, therefore few threats (horticultural collectors).

### *Aloe ballii* Reynolds var. *makurupiniensis* Ellert

Status: VU C1

Endemism: Near-endemic

Threats: Fires

Distribution: Rusitu Valley

Site: Haroni Gorge, Haroni and Chisengu confluence

Habitat: Grassland—Quartzite

On quartzite. Occurs from about 500 m near the Haroni Gorge up to about 900 m on the southern end of the main Chimanimani Mountain. Habitat burnt in very dry years.

### *Aloe collina* S.Carter

*Aloe sapanaria* (Aiton) Haw.

Status: VU A1cD2

Endemism: Endemic

Distribution: Nyanga

Site: Restricted to the area around Troutbeck

Habitat: Grassland?

### *Aloe hazeliona* Reynolds

Status: VU B1C2a

Endemism: Near-endemic

Threats: Collection

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite grassland at an altitude of 1,500 m. Fairly common. A few disjunct subpopulations known in the wild.

### *Aloe howmonii* Reynolds

Status: VU C2a

Endemism: Endemic

Threats: Collection

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite grassland. Altitude greater than 1,600 m. Fairly common. A few disjunct subpopulations known in the wild.

### *Aloe lutescens* Groenew.

Status: VU B1B2d

Endemism: Near-endemic

Distribution: Limpopo/Save Lowveld

Site: Gonarezhou, Buffalo Bend to Malapati on

Nuanetsi River

### *Aloe myriacantha* (Haw.) Schult. & Schult.f.

Status: VU A1c

Distribution: Eastern Highlands

Site: Nyanga to Chimanimani

Habitat: Rocky

### *Aloe ortholopha* Christian & Milne-Redh.

Status: VU A1dA2b

Endemism: Endemic

Threats: Agriculture, mining

Distribution: Great Dyke (N)

Site: Pass between Harare and Banket to Banirembizi at the end of Mavhuradonha Mountains

Habitat: Grassland—Serpentine

Occurs on serpentine soils in open, grass-covered country. Occurs on slopes and along ridges. The grass is frequently burnt but little harm seems to be done to the aloe, as its centre is protected by its thick flesh. Young seedlings were observed.

### *Aloe plowessii* Reynolds

Status: VU B1B2aC2a

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani, Muhohwa to south near Makurupini

Falls

Habitat: Grassland—Quartzite

On quartzite.

### *Aloe pretoriensis* Pole-Evans

Status: VU A1aC2c

Threats: Fire, deforestation

Distribution: Eastern Highlands

Site: South Chimanimani village to north of Nyanga, between Mutare and Headlands

Habitat: Grassland?

Nat fire-tolerant and susceptible to bush clearing.

### *Aloe rhodesiana* Rendle

Status: VU B1B2cC2a

Threats: Afforestation

Distribution: Eastern Highlands

Site: Nyanga to Vumba to Chimanimani

Habitat: Grassland?

Habitat reduced by commercial forestry (pine and gum trees).

### *Aloe spicata* L.f.

*Aloe tauri* L.C.Leach

Status: VU C1C2a

Threats: Fire

Distribution: Limpopo Escarpment, Limpopo/Save Lowveld

Site: Eastern Province from Cashel to South of Chipinge; Matibi No. 1 area (Mnene Mission, M'shunga Nibure-God's Needle 90 km east of Mount Igar, Mweza Range), possibly Triangle

Habitat: Rocky

Grows in dense masses on granite hills. Susceptible to fire. Large numbers of the South African form of this species occur in Limpopo Province (South Africa). Known only from three localities in Matibi No. 1 and surrounds.

### *Aloe suffulta* Reynolds

Status: CR B1B2bC2aD

Distribution: Limpopo/Save Lowveld

Site: Zamuchiya (Middle Save)

A very restricted area in the middle Save. Generally not a collector's species. Only one locality is known in Zimbabwe.

### *Aloe wildii* (Reynolds) Reynolds

Status: VU C1D1

Endemism: Near-endemic

Threats: Grazing/browsing

Distribution: Chimanimani

Site: The Corner/Martin Forest Reserve (from Muhohwa to southern end of range)

Habitat: Grassland—Quartzite

Eaten by some animals at ground level. Occurs on quartzite, grassland, at an altitude of 1,500 m.

## AMARYLLIDACEAE

### *Scodoxus pole-evansii* (Oberm.) Friis & Nordal

*Haemanthus pole-evansii* Oberm.

Status: VU D2

Endemism: Endemic

Distribution: Nyanga

Site: Nyamungura River (Tea Estates), Nyanga

Habitat: Grassland

Grassland. Specially protected plant in Zimbabwe.

Collectable species, though a decline can be suggested. Recorded only a few times from the Nyanga area.

## ANACARDIACEAE

### *Trichoscypha ulugurensis* Mildbr.

Status: CR B1B2c

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Haroni-Makurupini-Rusitu, Chimanimani

Habitat: Moist forest

Seedlings were found at both sites.

## ANNONACEAE

### *Monanthotaxis buchananii* (Engl.) Verdc.

Status: CR D

Distribution: Vumba

Site: Burma Valley

Only one record. Specimen was collected at an altitude of 1,000 m in rainforest on an unprotected private property. One individual seen. Shrub or tree.

## APIACEAE

### *Alepidea amatymbica* Eckl. & Zeyh.

Status: CR B1B2ccC2a

Threats: Collection

Distribution: Eastern Highlands

Site: Bundi Park, Engwe, Himalaya

Habitat: Grassland

Small bush. Bark and roots used for medicinal purposes. Historically rare. Very few protected.

## APOCYNACEAE

### *Adenium multiflorum* Klotzsch

*Adenium obesum* (Forssk.) Roem. & Schult. var. *multiflorum* (Klotzsch) Codd

Status: EN A1ad

Threats: Collection, grazing/browsing

Distribution: Limpopo/Save Lawveld

Habitat: Dry woodland

Heavily collected in past; whole plants are removed. Babaans have been observed uprooting plants in the Limpopo oreo. Occurs northwards to East Africa. Collected for medicinal and horticultural properties. Widespread in southern Zimbabwe.

### *Pachypodium saundersii* N.E.Br.

Status: VU A1cd B1 B2c

Threats: Collection

Distribution: Limpopo/Save Lawveld

Site: Save Valley, Runde River, Chipinge

Habitat: Dry woodland

Zimbabwe's only *Pachypodium*. A specially protected species in Zimbabwe. Habitat severely fragmented, declining. Widely collected.

### *Strophanthus courmontii* Sacleux ex Franch.

Status: VU D2

Distribution: Zambezi Lowveld, Rusitu Valley

Site: Mana Pools, Harani-Rusitu

Habitat: Dry forest, moist forest

Riverine. Two localities known.

### *Voacanga africana* Stapf

Status: CR D

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Haroni-Rusitu

Habitat: Moist forest

Only at low altitudes, about 340 m. Common in Mozambique.

## ARACEAE

### *Zamioculcas zamiifolia* (Lodd.) Engl.

Status: VU D2

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Haroni, Makurupini, Rusitu

Habitat: Moist forest

## ARECACEAE

### *Borassus aethiopicum* Mart.

Status: CR A1ad B1B2ce

Threats: Harvesting, collection

Distribution: Rusitu Valley, Limpopo Escarpment

Site: Ngorima Reserve, Bangala Falls on Mutirikwi

River, north of the main access to Bangala Dam from the Western turn-off in Chiredzi, 3 km northeast, east

and southeast of Haroni Gorge, Haroni-Rusitu

Habitat: Moist woodland

Besides Haroni-Rusitu, a few other planted subpopulations are known. Common in Mozambique and other countries. This species is now under threat from people who cut down mature plants to make a local brew. This practice has increased in the last few years.

### *Raphia farinifera* Gaertn.

Status: VU B1B2bcdC2a

Threats: Agriculture

Distribution: Eastern Highlands, Central Watershed

Site: Chimanimani, Stapleford, Palm Block,

Mavuradonha, Vumba

Habitat: Moist woodland

Moist population in the Palm Block has probably increased because of conservation measures, in past years. A few subpopulations known in the country. Generally in forming oreos. Common name is 'mwore'.

## ASCLEPIADACEAE

### *Brachystelma richardsii* Peckover

Status: VU A1ac

Endemism: Endemic

Distribution: Central Watershed, NW Zimbabwe

Site: Kadoma—Kariba, Kamativi

Habitat: Moist woodland

Open, flat miombo woodland in greyish brown loamy soil. The distribution of this species probably extends from Kodoma to Kariba. There is overgrazing in this oreo but this is reported to increase the diversity of various Asclepiadoceae.

### *Hoodia currorii* (Hook.) Decne. subsp. *lugardii* (N.E.Br.) Bruyns

Status: VU C1D1

Distribution: Limpopo/Save Lawveld

Site: SW Zimbabwe

Habitat: Dry woodland

Appears to have been found in a very limited oreo in southwestern Zimbabwe, very few plants have been found. Well-known from Batswana's Tuli area.

### *Huernia hislopitii* Turrill subsp. *robusta* L.C.Leach & Plowes

Status: VU B2ce

Endemism: Endemic

Distribution: Widespread

Site: Sengwa River (Sengwa Research Station), Gokwe,

Mabikwa near Lupane Hotel, Lupane, Robin's Camp

(Hwange National Park), Sebakwe Farm and Dam

(Kwekwe), Halfway House (between Lupane and

Victoria Falls), Bangola Farm (Nyamandhlavu),

Nyamandhlavu Saw Mills

Habitat: Dry woodland

Scattered distribution and rarely found. It is often associated with mapone woodland.

### *Huernia longituba* N.E.Br. subsp. *cashelensis*

L.C.Leach & Plowes

Status: VU B1B2c

Endemism: Endemic

Distribution: Eastern Highlands

Site: Mutambara (Chimanimani), Chatora Farm (Banti

Forest Reserve), Biriwiri (Chimanimani), West of

Chipinge (New Years Gift), southeast Mutare to west of

Chipinge (near Tanganda River)

Habitat: Rocky

Limited distribution. Grows on rocky Umkondo shale.

Confined to the Eastern Highlands. This plant was

originally known from Coshel-Mutambara oreo but is

now known to have a wider distribution.

### *Huernia volkartii* Peitsch ex Werderm. & Peitsch var. *repens* (Lavranos) Lavranos

Status: EN D

Threats: Damming

Distribution: Limpopo Escarpment—Nyoni Hills

Site: Tokwe-Mukorsi Dam

Habitat: Moist woodland

Found in moss in the mist belt. Known from only a single locality with a handful of individuals. Unlikely to be found elsewhere in the vicinity of the locality.

### *Orbeopsis caudata* (N.E.Br.) L.C.Leach subsp.

*rhodesiaca* (L.C.Leach) L.C.Leach

Status: CR D

Distribution: Limpopo Escarpment—Matopos

Site: Matopos to BallaBalla area

Habitat: Moist woodland

Scattered and not easily seen in miombo on granite sands. A dwarf form is known to exist.

### *Orbeopsis lutea* (N.E.Br.) L.C.Leach subsp. *lutea*

Status: VU D2

Distribution: Central Watershed

Site: Bulawayo

Habitat: Rocky

Sparsely scattered on a rocky ground which is not oroble.

### *Orbeopsis valida* (N.E.Br.) L.C.Leach

Status: VU D2

Collected only a few times in Zimbabwe. Is scarce.

### *Pachycymbium rogersii* (L.Bolus) M.Gilbert

Status: CR D

Threats: Agriculture

Distribution: Limpopo/Save Lowveld

Site: Chibwe

Habitat: Disturbed

Very restricted distribution. Area is heavily ploughed and only a few individuals were seen.

### *Tavaresia barklyi* (Dyer) N.E.Br.

Status: EN A1cA2cB2cd

Distribution: Northwestern Zimbabwe, Limpopo/Save

Lawveld

Site: Beitbridge

Habitat: Rocky

Very rare in Zimbabwe. Restricted distribution in southwestern Zimbabwe. Very difficult to find. Found in stony ground. Apparently reported to occur in Hwange and this should be verified.

## ASPLENIACEAE

### *Asplenium christii* Hieron.

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

Quite common in Chirinda Forest. This represents the only *Flara zambesiaca* record. Also occurs in South Africa, Kenya, and Tanzania.

### *Asplenium mossambicense* Schelpe

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

All the localities are isolated. Known only from Zimbabwe, Mozambique and Kenya.

### *Asplenium parablattophorum* A.Braithwaite

Status: VU D1D2

Endemism: Near-endemic

Distribution: Vumba, Rusitu Valley

Site: Haroni and Vumba

Habitat: Moist forest

Was taxonomically split from *A. aethiopicum* based on chromosomal studies. Known from the border between Mozambique and Zimbabwe. Found on the forest floor of evergreen forests.

### *Asplenium pellucidum* Lam. subsp. *horridum*

(Hieron.) Schelpe

Status: VU B1 B2c

Distribution: Rusitu Valley

Site: Haroni Gorge

Habitat: Moist forest

Low altitude evergreen forest. Often in spongy and seepage oreos in dense shade. Type from Tanzania. Also in Mozambique and Kenya.

### *Asplenium unilaterale* Lam.

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

Extremely rare. Last collected in 1951. Only a single report that it was recently seen. Also occurs in Malawi, Madagascar, Mauritius and the Mascarenes. Widespread in Tropical Africa.



## ASTERACEAE

*Geigeria schinzii* O.Hoffm. subsp. *sebungweensis* Wild

Status: VU B1B2c

Endemism: Endemic

Distribution: Zambezi Lowveld

Site: Gokwe, Sebungwe (plateau of the southern Zambezi Valley)

Habitat: Dry woodland

Known mainly from the Gokwe area.

*Helichrysum maestum* Wild

Status: VU D2

Endemism: Endemic

Distribution: Chimanimani

Site: Mount Peza

Habitat: Grassland—Quartzite

Quartzite endemic. Known only from the craggs on Mount Pezo.

*Senecio aetfatisensis* B.Nord.

Status: VU D2

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Altitude of 1,400 m. Habitat is not under threat. Could be more widespread as the species was recently described.

*Vernonia graniticola* G.V.Pope

Status: VU D2

Endemism: Endemic

Distribution: Central Watershed

Site: Ngomokurira

Habitat: Wetland

Shallow soils and seepage areas on granite outcrops.

## BIGNONIACEAE

*Fernandoa magnifica* Seem.

Status: EN C1C2b

Threats: Agriculture

Distribution: Limpopo/Save Lowveld

Site: Save Valley, Runde

Habitat: Moist woodland

Rare, scattered and restricted to sand. Unprotected. Not used for timber. Habitat lost because of pressure for agricultural land.

## BURSERACEAE

*Commiphora neglecta* I.Verd.

Status: CR B1B2bD

Distribution: Limpopo/Save Lowveld

Site: One hill in Chisumbanje

Habitat: Rocky

A communal area. Habitat on rock outcrops.

## CANELLACEAE

*Warburgia salutaris* (Bertol.f.) Chiov.

Status: CR A1d B1B2abcdeC1C2a D

Threats: Harvesting

Distribution: Limpopo Escarpment—Chippinge

Site: Tanganda River in Tanganda Tea Estates, Chikare

Mission, Ngungunyana Forest

Habitat: Moist woodland

Historically rare in Zimbabwe. Fewer than ten mature plants are known to grow in the wild in Zimbabwe. This could be a result of collectors (medicinal). The plant is believed to be extinct by some people but others believe there could still be one or a few individuals remaining.

## CAPPARACEAE

*Maerua salicifolia* Wild

Status: VU D2

Endemism: Endemic

Threats: Agriculture, browsing

Distribution: Zambezi Lowveld

Site: Mopane fringing Malabola Flats in Gokwe, Segwa Research Station, Goredema Diptank in Chief Chireyas area (between Bumi and Kaenga River), Lusulu

Veterinary Ranch in Binga, Sengwe

Habitat: Dry woodland

Mopane woodland, bare ground and sandy soils. Habitat under threat especially from agriculture and browsing by elephants.

## CARYOPHYLLACEAE

*Dianthus chimanimaniensis* Hooper

Status: VU D2

Endemism: Near-endemic?

Distribution: Chimanimani

Habitat: Grassland—Quartzite

Status will probably need to be revised.

## CELASTRACEAE

*Maytenus chasei* N.Robson

Status: VU D2

Endemism: Near-endemic

Distribution: Vumba

Site: Bunga Forest, Penhalonga to Mozambique

Habitat: Moist forest

Endemism plausible.

## COMBRETACEAE

*Combretum coriifolium* Engl. & Diels

Status: EN B1B2cC2b

Threats: Habitat degradation

Distribution: Rusitu Valley

Site: Haroni-Rusitu, East of Haroni River, Chisengu

River, Sabie River, Chusenga River, Rusitu, Makurupini-Rusitu area

Habitat: Moist forest

Habitat threatened. A rare plant in Zimbabwe with a very limited distribution.

*Combretum umbricola* Engl.

Status: CR B1B2bcC2aD

Threats: Habitat degradation

Distribution: Limpopo Escarpment—Chippinge

Site: Chippinge

Habitat: Dry forest

Found near Chippinge in a gully area. Has a significant range and altitude extension, restricted areas which are heavily under threat. Known from only two localities; both are now heavily degraded. Only one record in the herbarium. This is a very rare plant.

## COMMELINACEAE

*Triceratella drummondii* Brenan

Status: EX?

Threats: Habitat degradation

Distribution: Limpopo/Save Lowveld

Site: Chitrapudzi in Beitbridge

Habitat: Wetland

Seepage on Cretaceous sandstone. Recently found in Mozambique at a locality more than 1,000 km from the type locality in Zimbabwe. Habitat on the edges of dry forests and Cretaceous sandstone is restricted in Zimbabwe. Type locality degraded.

## CONNARACEAE

*Cnestis polyphylla* Lam.

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

*Santaloides afzelii* Schellenberg

Status: VU D2

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni-Makurupini

Habitat: Moist forest

Plenty of seedlings and a few mature plants.

## CONVOLVULACEAE

*Ipomoea verrucisepala* Verdc.

Status: VU D2

Endemism: Endemic

Distribution: Grassland

Site: Umvukwes Range in Mpinga Pass, Murahwa's Hill in Mutare

Habitat: Grassland—Moist woodland

Woodland and roadsides. Not endemic to the Great Dyke; also recorded from Mutare.

## COSTACEAE

*Costus afer* Ker Gawl.

Status: VU D2

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni-Makurupini

Habitat: Moist forest

## CRASSULACEAE

*Crassula fragilis* R.Fern. var. *suborbicularis* R.Fern

Status: VU D2

Endemism: Endemic

Distribution: Eastern Highlands

Site: Fargell Farm, Chippinge

Habitat: Moist woodland

Occurs in massive shale outcrops, in rock cracks and very thin soil, in shade. Known from type specimen only.

## CUCURBITACEAE

*Acanthosicyos naudinianus* (Sond.) C.Jeffrey

Status: VU B1B2c

Distribution: Northwestern Zimbabwe, Limpopo/Save Lowveld

Site: Kazungulu, Hwange National Park, Gonarezhou

National Park

Habitat: Dry woodland

On deep sandy soils.

*Cyclantheropsis parviflora* (Cogn.) Harms

Status: VU A1aB2c

Distribution: Zambezi Lowveld, Limpopo/Save Lowveld

Site: Kariba Gorge, Umvumvumu River

Habitat: Dry woodland

Lowveld, nowhere common, 180–900 m.

*Peponium caledonicum* (Sond.) Engl.

Status: VU D2

Distribution: Limpopo Escarpment—Matopos

Site: Matopos

Habitat: Moist forest

Probably more sites, not recorded from elsewhere nor in Flora zambesiaca as occurring in Zimbabwe.

*Zehneria scabra* (L.f.) Sond. subsp. *argyrea* (A.Zimm.) C.Jeffrey var. *chirindensis* C.Jeffrey  
Status: VU D2

Endemism: Endemic  
Distribution: Chirinda  
Site: Chirinda forest  
Habitat: Moist forest

*Cleorings and margins of rainforest. The taxonomy may need further examination.*

## CUPRESSACEAE

*Juniperus procera* Hochst. ex Endl.

Status: CR D

Distribution: Nyanga

Site: Nyahakwe Hill in Van Niekerk Ruins

Habitat: Moist woodland

*Have viable seed in the Zimbabwe Botanical Garden. In Zimbabwe this species has only been recorded from Nyongo on Ziwo Form. Strongly suspected that this individual was planted there. This is a specially protected species in Zimbabwe, but the oreo is not conserved. Also occurs in Malawi and further afield. Global status LR-nt.*

## CYATHEACEAE

*Cyathea mossambicensis* Baker

Status: VU C2a

Distribution: Nyanga, Chirinda

Site: Near Chirinda—next to Tea Estate, Aberfoyle Tea Estates

Habitat: Moist forest

*Limited distribution. Probably vulnerable for all the countries. Protected at Aberfoyle. Frequent in Molowi.*

*Cyathea* sp. cf. *C. humilis* Hieron.

Status: EN B1B2acd

Threats: Habitat degradation

Distribution: Rusitu Valley

Site: Harani, Makurupini

Habitat: Moist forest

*The only record of the Flora zambesiaca oreo. Altitude of 380 m. Known from the following record collected in 1982: J.E.Burrows 2788 (K, Buffelskloof Herbarium). Collected below waterfalls.*

*Cyathea thomsonii* Baker

Status: CR D

Distribution: Vumba, Limpopo Escarpment—Bikita

Site: Northern Vumba, Bikita

Habitat: Moist forest

*Not known if it is still there, less than 25 mature individuals were seen in the late 1970s. The habitat is probably stable but not protected.*

## DICHAPETALACEAE

*Dichapetalum madagascariense* Poir.

Status: EN D

Threats: Collection

Distribution: Rusitu Valley

Site: Harani-Makurupini

Habitat: Moist forest

*Only recorded from Harani-Makurupini forest. Very rare. Very low numbers of individuals.*

## EBENACEAE

*Diospyros hoyleana* F.White subsp. *angustifolia* F.White

Status: CR D

Threats: Collection

Distribution: Rusitu Valley

Site: Harani-Makurupini

Habitat: Moist forest

*One plant seen in Zimbabwe, but more frequent in Mozambique. No known change in species numbers.*

## EUPHORBIACEAE

*Bridelia atroviridis* Mull.Arg.

Status: CR C2aD

Threats: Collection, agriculture

Distribution: Rusitu Valley, Chirinda

Site: Rusitu forest, Chirinda forest

Habitat: Moist forest

*Habitat is restricted.*

*Clusia monticola* S.Moore var. *stelleroideus* (S.Moore) Radcl.-Sm.

*Clusia stelleroides* S.Moore

Status: VU D1 D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Eastern Highlands

Site: Mutare, passably northern Chimanimani

Habitat: Grassland

*Submontane grassland. Altitude: 1,525–1,830 m. The area has undergone changes in habitat.*

*Clusia sessilifolia* Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: Chimanimani

Site: Summit of Binga Mountain

Habitat: Rocky

*High altitude (1,980–2,420 m) on quartzite.*

*Occasionally on rocky mountain summits.*

*Croton leuconeurus* Pax

Status: CR B1B2cbd

Threats: Browsing, alien plant infestation

Distribution: NW Zimbabwe

Site: Victoria Falls

Habitat: Moist woodland

*Only known from above Victoria Falls. Riverine fringing habitat. Naraw habitat. Habitat threatened by animals,*

*mainly elephants, which open up the forest for plant*

*invaders (Lantana camara).*

*Euphorbia acervata* S.Carter

Status: VU B1B2cD2

Endemism: Endemic

Distribution: Great Dyke (N & S)

Site: Umvukwe Hills, Mtaroshanga Pass, near Mpinga,

1 km north of Ngezi Dam, Otto Mine

Habitat: Grassland—Serpentine

*In grass amongst rocks in open woodland. 1,400–1,700 m. The habitat is serpentine grassland. Differs from E. tortistyla in producing more compact habit of small rounded 'cushions' (hence the name: acervatus = in heaps).*

*Euphorbia confinalis* R.A.Dyer subsp. *confinalis*

Status: VU A1c

Distribution: Limpopo Escarpment—Chippinge

Site: Rushinga District, Mount Silinda, Chippinge

District: Sabi Valley

Habitat: Dry woodland

*Euphorbia confinalis* R.A.Dyer subsp. *rhodesiaca* L.C.Leach

Status: VU A1c

Endemism: Endemic

Distribution: Limpopo Escarpment—Bikita

Site: Moodies Pass, (Bikita), Hendriks Pass (southern

Matapas), Chivi

Habitat: Dry woodland

*Known from western and southern Zimbabwe.*

*Euphorbia decidua* Bally & L.C.Leach

Status: EN A1cdB2ce

Threats: Collection

Distribution: Zambezi Lowveld, Zambezi Escarpment

Site: Hurungwe, Guruve, Makande districts

Habitat: Moist woodland

*Very widespread.*

*Euphorbia dissitispina* L.C.Leach

Status: VU D2

Endemism: Endemic

*Known only from the type locality and described from cultivated material. Could be a weak form of E. malevola.*

*Euphorbia fortissima* L.C.Leach

Status: VU A1acB2c

Distribution: Northwestern Zimbabwe

*Site: Zambezi River near Victoria Falls, scattered colonies east from Victoria Falls to Deka/Zambezi junction, and south to Matetsi River, Hwange and as far south as the Kapata River*  
Habitat: Dry woodland

*Euphorbia halipedicola* L.C.Leach

Status: VU A1c

Distribution: Limpopo Escarpment—Chippinge

Site: Chippinge District, Sabi Valley

*Scattered and uncommon. Reported from Mozambique.*

*Euphorbia lividiflora* L.C.Leach

Status: VU A1c

Distribution: Limpopo/Save Lowveld

Site: Sabi Valley, Rupezi, Gonarezhou

*Few scattered records only.*

*Euphorbia maleolensis* Phillips

Status: EN A1acA2cB1B2c

Threats: Habitat degradation, collection

Distribution: Central Watershed

Site: Matabeleland South

*Reported west of Bulawayo.*

*Euphorbia memorialis* R.A.Dyer

Status: VU B1B2acC2a

Endemism: Endemic

Threats: Mining

Distribution: Great Dyke (N)

*Site: Umvukwe Mountains, between Mutarashanga and Horseshoe*

*Habitat: Grassland—Serpentine*

*Affected by chrome mining. Large-scale chrome mining and pick and shovel mining.*

*Euphorbia rugosiflora* L.C.Leach

Status: VU C2a

Endemism: Near-endemic?

Distribution: Chimanimani

Site: Northern Chimanimani (The Corner)

Habitat: Grassland—Quartzite

*First described in 1990. The type locality probably has about 60 plants, and is protected by rangers. Fruit is bright red.*

*Euphorbia trichadenia* Pax var. *gibbsiae* N.E.Br.

Status: EN A1cdB1B2c

Endemism: Endemic

Threats: Habitat degradation

Distribution: Central Watershed

Site: Matopos, Harare

*Scattered distribution in western and central parts of Zimbabwe.*

*Mallotus oppositifolius* (Geiseler) Mull.Arg. var.

*oppositifolius* forma *polycyctotrichus* Radcl.-Sm.

Status: CR B1B2abc

Endemism: Endemic

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

*Occurs in mixed evergreen forest, in drier parts of moist habitats, at an altitude of 1,000 m. Found in small unprotected patches.*

*Neopsestia castaneifolia* (Baill.) Bouchat &

J.Léonard subsp. *chirindica* (Radcl.-Sm.) Bouchat

& J.Léonard

*Neopalissy castaneifolia* subsp. *chirindica* Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: Limpopo/Save Lowveld

Site: Chirinda forest

Habitat: Moist forest



A small understory tree of submontane evergreen forest. Altitude of 1,100–1,160 m. No habitat changes. No evident threats.

**Suregada procera (Prain) Croizat**  
**Status:** VU B1B2cD1  
Distribution: Chirinda  
Site: Gonarezhou forest  
Habitat: Moist forest

**Suregada zanzibariensis Baill.**  
**Status:** VU D2  
Distribution: Limpopo/Save Lowveld  
Site: Gonarezhou National Park  
Habitat: Dry forest  
*Cretaceous sandstone enclosed Androstachys woodland. In forest, woodland and salt marshes. Well-represented outside Zimbabwe. Several localities in Gonorozhou.*

**Tannodia swynnertonii (S.Moore) Prain**  
**Status:** VU B1B2cD2  
Distribution: Chirinda  
Site: Chirinda forest  
Habitat: Moist forest

FLACOURTIACEAE

**Bivinia jalbertii Tul.**  
**Status:** CR C1  
Threats: Forestry exploitation  
Distribution: Limpopo Escarpment—Nyani, Chipinge  
Site: Njenja Hills, Nyoni Hills, Chivi/Chipinge  
Habitat: Moist woodland  
*It was probably dispersed by wind to more localities than are currently known in an area stretching from Chipinge to Bangala. Extremely rare tree.*

**Homalium abdessammadii Asch. & Schweinf. subsp. wildemanianum (Gilg) Wild**  
**Status:** CR B1B2cD  
Threats: Habitat degradation, alien plant infestation  
Distribution: NW Zimbabwe  
Site: Above Victoria Falls  
Habitat: Moist woodland  
*Riverine fringes and surrounding ponds. Narrow habitat. Elephants damage the habitat, Lantana camara poses a threat.*

**Scolopia mundii (Eckl. & Zeyh.) Warb.**  
**Status:** CR D  
Distribution: Nyanga, Chimanimani  
Site: Nyamingura Valley (Nyanga), Gwendingwe Estate (Chimanimani), western slope of Mount Inyangani on Circular Drive  
Habitat: Moist forest  
*One locality is protected and the other one is not. Rare species.*

HAMAMELIDACEAE

**Trichocladus ellipticus Eckl. & Zeyh. subsp. malosanus (Baker) Verde.**  
**Status:** VU D1D2  
Threats: Collection, agriculture  
Distribution: Nyanga, Rusitu Valley  
Site: Haroni-Rusitu, Nyazengu  
Habitat: Moist forest  
*Not a common species.*

HIPPOCRATEACEAE

**Hippocratea goetzei O.Loos.**  
**Status:** VU B1B2cD2  
Threats: Habitat degradation  
Distribution: Chirinda  
Site: Chirinda forest  
Habitat: Moist forest  
*In Chirinda and some outliers. There is one outlier that is seriously threatened.*

**Salacia erecta (G.Don) Walp.**  
**Status:** CR D  
Distribution: Nyanga, Rusitu Valley  
Site: Mutarazi, Chisenge gorge towards Haroni  
Habitat: Moist forest  
*Two immature plants in each area.*

**Salacia leptoclada Tul.**  
**Status:** EN C2a  
Threats: Collection, agriculture  
Distribution: Rusitu Valley  
Site: Haroni-Rusitu  
Habitat: Moist forest  
*Occurs in small patches of transitional woodland to forest. Narrow habitat in fringe forest.*

ICACINACEAE

**Pyrenacantha kirkii Baill.**  
**Status:** VU D2  
Threats: Collection, agriculture  
Distribution: Rusitu Valley  
Site: Haroni-Makurupini-Rusitu  
Habitat: Moist forest  
*Climber.*

IRIDACEAE

**Hesperantha ballii Wild**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Point 71, Binga  
Habitat: Grassland—Quartzite  
*Only two specimens collected (1961). Known from a high altitude.*

LAMIACEAE

**Leucas hephaestis (Wild) Sebald**  
*Lasiacorys hephaestis* Wild  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Great Dyke (N)  
Site: Mavuradonha Mountains  
Habitat: Grassland—Serpentine  
*Known only from the type.*

LAURACEAE

**Ocotea kenyensis (Chiov.) Robyns & R.Wilczek**  
**Status:** CR B1B2cD  
Threats: Habitat degradation, afforestation  
Distribution: Chimanimani  
Site: Chipinge  
Habitat: Moist forest  
*Mutema Communal Land. Found in small habitats. Reported to have been observed in 1982 towards Chipinge. Protected by local people. Decimated by forestry plantations. Needs small gaps to regenerate. Well-represented outside Zimbabwe: DRC, Ethiopia, Kenya.*

LEGUMINOSAE: CAESALPINIOIDEAE

**Cassia afrodistula Brenan**  
**Status:** CR D  
Threats: Agriculture  
Distribution: Limpopo/Save Lowveld  
Site: Mahenye area  
Habitat: Dry woodland  
*In Kirkia woodland. Only one individual known. Habitat threatened by cultivation.*

**Schotia capitata Bolle**  
**Status:** CR D  
Distribution: Limpopo/Save Lowveld

Site: North of the railway line Gonarezhou National Park  
Habitat: Dry woodland  
*Woodland, on sand. A small tree. Widespread. No known threat.*

LEGUMINOSAE: MIMOSOIDEAE

**Acacia adenocalyx Brenan & Exell**  
**Status:** CR D  
Threats: Habitat degradation  
Distribution: NE Lowveld  
Site: Chibutsu hill  
Habitat: Dry forest  
*Both known localities are on the same hill. Habitat restricted to gullies. May also occur elsewhere in the area, although known from very few individuals.*

**Acacia exuvialis I.Verd.**  
**Status:** VU D2  
Threats: Browsing  
Distribution: Limpopo/Save Lowveld  
Site: Near Chikambedzi- Gonarezhou National Park  
Habitat: Dry woodland  
*Confined to Cretaceous sandstone.*

**Acacia hebeclada DC. subsp. chobiensis (O.B.Mill.) A.Schreib.**  
**Status:** VU D2  
Threats: Browsing  
Distribution: NW Zimbabwe  
Site: Victoria Falls, Kazungula  
Habitat: Dry woodland  
*Same localities in a protected area. Probably under 250 mature individuals. Major threat comes from elephants. Population spreading along Zombezi River.*

**Acacia permixta Burt Davy**  
**Status:** VU D2  
Distribution: Limpopo/Save Lowveld  
Site: Fort of Tuli  
Habitat: Dry woodland  
*One subpopulation confirmed. No known threats.*

LOBELIACEAE

**Belobelia lobata E.Wimm.**  
**Status:** VU D2  
Endemism: Endemic  
Distribution: Limpopo Escarpment—Matopos  
Site: Farm Besna Kobila in Matobo District  
Habitat: Grassland  
*It is apparently not known from outside Matopos. Known from rocky areas, under overhanging rocks in moist places. All collections from Farm Besna Kobila. Grows under overhanging rocks in moist and rocky places.*

**Belobelia stricklandae Gilliland**  
**Status:** VU A1a  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Eastern Highlands  
Site: Vumba Mountains, Belmont Forest, Penhalonga in Nyanga, Ziwan Forest  
Habitat: Moist forest  
*Most sites were revisited in 1995, but no plants could be found. The major threat to this species in Zimbabwe is loss of habitats. The habitat is under Eucalyptus plantations.*

LOGANIACEAE

**Strynchos angolensis Gilg**  
**Status:** VU D2  
Distribution: Eastern Highlands  
Site: Pungwe Gorge, Burma Valley  
Habitat: Moist forest  
*Low altitude, outliers with an area of 2–5 ha each. Not under threat. This species is sometimes placed in the family Strynchaceae.*

***Strychnos mellodora* S.Moore****Status:** VU D2

Threats: Forestry exploitation

Distribution: Chirinda

Site: Chirinda Forest

Habitat: Moist forest

*Locally common. Also known from Mozambique, Kenya and Tanzania.****Strychnos mitis* S.Moore****Status:** VU D2

Threats: Habitat degradation

Distribution: Chirinda, Limpopo Escarpment

Site: Chirinda Forest, Bikita, Wedza

Habitat: Moist forest

*Also known from Malawi, Uganda and other countries.**Known only from moist or kloof forest.*

## MALPIGHIACEAE

***Acridocarpus natalitius* A.Juss.****Status:** CR B1B2abcD

Threats: Habitat degradation, grazing

Distribution: Limpopo Escarpment—Chipinge

Site: Chipinge

Habitat: Dry woodland

*Found in one location in precocious habitat. It is a twining climber. Habitat is extremely limited in Zimbabwe.*

## MELASTOMATACEAE

***Warneckea sansibarica* (Taub.) Jacq.-Fél. subsp.*****buchanani* (Gilg) Borhidi****Status:** CR B1B2cD

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni-Makurupini

Habitat: Moist forest

*A rare plant in Zimbabwe. Is a lowland forest species. Severely restricted. Probably fairly stable.*

## MELIACEAE

***Lovoa swynnertonii* Baker f.****Status:** VU D2

Endemism: Endemic

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

*Only one locality. Not rare. Some distribution as Gardenia posoqueriodes.*

## MENISPERMACEAE

***Dioscoreophyllum cumminsii* (Stapf) Diels var.*****leptotrichos* Troupin****Status:** VU D1D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

*Uncertain in Chirinda Forest.*

## MESEMBRYANTHEMACEAE

***Delosperma steytleriae* L.Bolus****Status:** VU B1B2c

Endemism: Endemic

Distribution: Nyanga, Limpopo Escarpment

Site: Acropolis of the Zimbabwe Ruins, Bonda Mission, World's View, Masvingo

Habitat: Rocky

*Some of the plants are in rural areas. Grows on granite hills. Numbers not known. No real threats, as it is not a collector's item. No evidence that there is a decline, but this may occur in future.*

## MORACEAE

***Ficus bubu* Warb.****Status:** CR D

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni-Makurupini

Habitat: Moist woodland

*Widely distributed fig tree, but always found singly.****Ficus fischeri* Warb. ex Mildbr. & Burret****Status:** CR D

Distribution: Chirinda

Site: South of Chirinda forest, Sabi

Habitat: Moist woodland

*Just one tree from one locality. Also in DRC and Tanzania.****Ficus ottoniifolia* (Miq.) Miq. subsp. *ulugurensis* (Mildbr. & Burret) C.C.Berg***Ficus madesta* F.White**Status:** CR D

Threats: Agriculture

Distribution: Nyanga

Habitat: Moist forest

*Recorded on one place, Eastern Highlands Teo Estate, along the stream. It occurs in a very small area. About five mature trees exist there.****Ficus scassellatii* Pamp.****Status:** VU D2

Distribution: Chirinda

Habitat: Moist forest

*This species grows in mid-altitude semi-evergreen forest (1,900–1,950 m). It has a wide distribution, occurring in Tanzania, Kenya, Uganda, and the eastern part of DRC. It is a tall strangler fig, recorded as growing up to heights of 50 m.****Ficus vallis-choudae* Delile****Status:** EN B1B2cD

Threats: Agriculture, habitat degradation

Distribution: Rusitu Valley

Site: Haroni-Rusitu

Habitat: Moist forest

*Strictly riverine, widely spread along a 10 km riverine fringe. Habitat is surrounded by agricultural fields.****Milicia excelsa* (Welw.) C.C.Berg****Status:** EN B1B2bce D

Threats: Habitat degradation, agriculture

Distribution: Rusitu Valley, Limpopo/Save Lowveld

Site: Haroni-Rusitu, Makurupini, Ganarezhou, along the Runde

Habitat: Moist forest

*This tree can grow up to 20–50 m tall. It is a widespread tropical African genus. Heavily utilised as a timber species; commonly called 'eraca'.****Morus mesozygia* Stapf ex A.Chev.****Status:** CR D

Threats: Agriculture

Distribution: Rusitu Valley

Site: Haroni-Rusitu (Westbank)

Habitat: Moist forest

*Area subject to human exploitation. One individual observed. Highly desirable timber species.****Streblus usambarensis* (Engl.) Berg****Status:** CR D

Threats: Agriculture

Distribution: Rusitu Valley

Site: Haroni

Habitat: Moist forest

*Only a single juvenile was recorded from Haroni recently. This is the only record of the species in Zimbabwe. The species is not very well-represented outside Zimbabwe.*

## OCHNACEAE

***Ochna afzeloides* N.Robson****Status:** CR D

Distribution: Zambezi Lowveld

Site: West of Sengwa Wildlife Research Station

Habitat: Dry forest

*Distribution the same as for Rytigina umbellata. Also in Tanzania and DRC.*

## ORCHIDACEAE

***Aerangis kotschyana* (Rchb.f.) Schltr.****Status:** EN B1B2ceC1

Distribution: Zambezi Lowveld, Rusitu Valley

Site: Zambezi Valley 32 km southeast of Kariba, Rusitu

Nyahodi Valley in Chimanimani

Habitat: Moist forest; epiphyte

*An epiphytic orchid in woodland and forest beside rivers and lakes, in low altitude rain forest and in cool forest, often on trunks and lower branches of large, old trees. Two isolated subpopulations. The Zombezi subpopulation is probably extinct. Also occurs in Tropical Africa.****Aerangis rusituensis* Fiebeck & Dare***Aerangis verdickii* (De Wild.) Schltr. var. *rusituensis* (Fiebeck & Dare) la Croix & P.J.Cribb**Status:** CR C2b

Endemism: Endemic

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Chimanimani, Rusitu

Habitat: Moist woodland; epiphyte

*Occurs at an altitude of 300–800 m in a tropical lowland locality. It is a collector's item, since it is easy to cultivate. Mixed deciduous woodland. The taxonomy of this plant is disputed.****Aeranthus africana* J.Stewart****Status:** EN B1B2cd

Endemism: Endemic

Threats: Collection

Distribution: Vumba

Site: Castle Beacon, Vumba Mountains

Habitat: Moist forest; epiphyte

*This is a palaeoendemic first described in 1978. The Vumbo subpopulation might be depleted. It grows in a montane mist belt. It has no horticultural value, but it may be a local collector's item. It is very specific to Padacarpus latifolia.****Aeranthus parkesii* G.Will.****Status:** CR B1B2cc1

Endemism: Endemic

Threats: Agriculture

Distribution: Nyanga

Site: Hande Valley, Inyangani Mountain (eastern

slopes), Aberfoyle Tea Estate

Habitat: Moist forest; epiphyte

*A palaeoendemic; small subpopulations. Known from only one locality in the Hande Valley, although this species may have been overlooked. This is a high rainfall area, which is heavily populated by people. There are fewer than 250 mature individuals. Habitat is threatened.****Angraecopsis trifurca* (Rchb.f.) Schltr.****Status:** EX?

Distribution: Rusitu Valley

Site: Nyahodi Valley

Habitat: Moist forest; epiphyte

*Mother calany is in Camarens (± 2,000 km from Zimbabwe). It is a palaeoendemic, an epiphytic or lithophytic orchid. This species has probably been overlooked. Occurs in evergreen rain forest and massy rocks in shade. This species was last collected in 1951.****Angraecum chimanimaniense* G.Will.****Status:** EN B1B2d

Endemism: Endemic

Distribution: Eastern Highlands



Site: Chimanimani, Vumba, Stapleford  
Habitat: Moist forest; epiphyte  
*Epiphytic or lithophytic in riverine forest. Rare and small subpopulations. Palaeoendemic. Difficult to cultivate and flowers last only two days. Attractive plant with succulent leaves. High altitude and high rainfall.*

**Angraecum stella-africae P.J.Cribb**  
Status: EX?

Habitat: Moist forest; epiphyte  
Known from only one or two collections in each country. This species has probably been overlooked. Closely related to *Angraecum chimanimaniense*. Seems to be extinct in Zimbabwe, where it is said to have been collected once and not been found again after several attempts.

**Bulbophyllum ballii P.J.Cribb**  
Status: VU D2

Endemism: Endemic?  
Threats: Habitat degradation  
Distribution: Eastern Highlands  
Site: Vumba, Rusitu  
Habitat: Moist forest; epiphyte  
Described in 1978. Fewer than 10 localities. Restricted distribution. Could be a palaeoendemic. Restricted areas smaller than 500 km<sup>2</sup>. No horticultural potential. Riverine forest is a sensitive habitat, for example, in Rusitu. May also occur in Zambia.

**Centrostigma occultans (Welw. ex Rchb.f.) Schltr.**  
Status: EN B1B2cC2b

Threats: Habitat degradation  
Distribution: Central Watershed  
Site: Borrowdale in Harare, Nyanga  
Habitat: Damba  
A rare orchid. Only one habitat in Zimbabwe intact, north of Harare (an private property). Many surveys have failed to find this species. There is a historical record for it in Pungwe (1931), but it was never refound there. This species needs a wet habitat.

**Chaseella pseudohydra Summerh.**

Status: EN B1B2c  
Threats: Agriculture  
Distribution: Nyanga, Rusitu Valley  
Site: Honde Gorge, Mutare, Honde Valley, Haroni Gorge  
Habitat: Moist forest; epiphyte  
In Honde, the habitat is threatened due to agriculture, numerous searches for it was negative. Haroni Gorge subpopulation is safe. Also in Kenya (2,000 km away), but this has not been confirmed because it did not flower. Is in cultivation. A rare epiphyte.

**Diaphanthe fragrantissima (Rchb.f.) Schltr.**

Status: CR C2b  
Distribution: Rusitu Valley  
Site: Rusitu  
Habitat: Moist forest; epiphyte  
Riverine forest. Widespread in Africa. It is a large plant.

**Diaphanthe kamerunensis Schltr.**

Status: CR C2a  
Threats: Collection  
Habitat: Moist woodland  
Riverine and unlikely to be built up; hence area is safe. Single subpopulation known.

**Eulophia sp. Wild 3991**

Status: VU D2  
Endemism: Endemic  
Threats: Mining  
Distribution: Great Dyke (N)  
Site: Mutarashanga  
Habitat: Grassland—Serpentine  
Number of plants unknown. Fairly conspicuous. It is a distinct species. The Wild specimen is unsuitable for a description, but the area has been surveyed three times and a similar looking plant has never been found again. Known only from the type specimen.

**Eulophia hereroensis Schltr.**

Status: VU D2  
Threats: Urban expansion, habitat degradation  
Distribution: Central Watershed  
Site: Bulawayo, Harare, Mutare  
Habitat: Moist woodland-Rocky  
The Harare subpopulation is threatened by sewerage works. Harare subpopulation is the largest with about 1,000 mature individuals and occupies about 2–3 km<sup>2</sup>. Other two subpopulations not well-known.

**Eulophia walleri Kraenzl.**

Status: CR C2bD  
Distribution: Northwestern Zimbabwe  
Site: Kazuma Pan Hwange National Park  
Habitat: Dry woodland  
In Zimbabwe it occurs only on Kalahari sand. Only one site, inside a National Park in Zimbabwe. Tropical Africa.

**Habenaria unguilabris B.R.Adams**

Status: CR B1B2cC1  
Endemism: Endemic  
Threats: Agriculture, habitat degradation  
Distribution: Central Watershed (N)  
Site: South of Chenanga Camp, near Southern boundary of Doma Safari Area, Makonde District  
Habitat: Moist woodland  
Often found in clearings in *Brachystegia boehmii* woodland on shallow, sandy soil. Habitat is desirable for agriculture, threatened. Only one collection in 1959. Not well-surveyed.

**Neobolusia ciliata Summerh.**

Status: VU D2  
Endemism: Near-endemic  
Threats: Agriculture  
Distribution: Eastern Highlands  
Site: Rusape, Chimanimani  
Habitat: Grassland  
Gronite. High grassy plateau in montane grassland. Locality sensitive in Rusape to human impacts since it is a grassland in a rural area.

**Neobolusia stolzii Schltr. var. glabripetala Summerh.**

Status: VU D1D2  
Endemism: Endemic  
Threats: Afforestation, alien plant infestation  
Distribution: Nyanga  
Site: Foot of Mount Inyangani (Nyanga Downs, rock edge near Pungwe Falls, near Nyangombe River), Pungwe Gorge  
Habitat: Grassland  
Damp montane grassland amongst rocks on seepage slopes. Altitude of 1,800–2,300 m. Endemic to the foot of Mount Inyangani. The Pungwe Gorge subpopulation was found in February 2000. Habitat threatened by wattle and pines.

**Oeceoclades decaryana (H.Perrier) Garay & P.Taylor**

Status: EX?  
Threats: Habitat degradation  
Distribution: Chimanimani  
Site: Umvumuvu River  
Habitat: Moist forest  
Riverine forest in rocky areas, under bushes on rock outcrops. Also in coastal forest. Destroyed by construction, search and rescued in the 1990s, now in cultivation. Habitat destroyed by Cyclone Elina in March 2000. Said to be extinct in Zimbabwe.

**Oeceoclades quadriloba (Schltr.) Garay & P.Taylor**

Status: CR A2c  
Threats: Damming  
Distribution: Limpopo/Save Lowveld  
Site: Tokwe-Mukosi dam area, Nyoni Hills  
Habitat: Moist forest  
In shade and riverine gully forest. Relicts. Up to a few hundred plants. The locality will be flooded when the Tokwe-Mukosi Dam is finished. Also recorded in Madagascar.

**Oligophyton drummondii H.P.Linder & G.Will.**

Status: VU D2  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Chimanimani  
Habitat: Grassland—Quartzite  
Montane zone, in sandy, quartzitic soil. Possibly overlooked. Very restricted. About 2,000 m altitude.

**Platycoryne affinis Summerh.**

Status: VU A2cC2  
Endemism: Endemic  
Threats: Desiccation  
Distribution: Central Watershed  
Site: Besna Kobilu (Matopos), Dunedin Farm (Rusape), a stream in Beatrice, Umwinsdale Road, Harare (Rumari Vlei, Prince Edward Dam Vlei, Chakamo Vlei, Ruwa River), Chipinge (Green Valley), Diggelofeld (Marandera)  
Habitat: Damba  
Dambas, a threatened habitat as a result of desiccation. Widespread in Zimbabwe, but never in abundance. Sporadic distribution of small subpopulations. Can be confused with *Platycoryne protearum*.

**Polystachya golungensis Rchb.f.**

Status: CR C2b  
Distribution: Rusitu Valley  
Site: Rusitu Valley, Burma Valley  
Habitat: Moist forest  
Widespread in Africa. It is a large plant.

**Polystachya lindblomii Schltr.**

Status: CR D  
Distribution: Chimanimani  
Site: Pungwe Falls (2 km below falls)  
Habitat: Moist forest

**Polystachya pubescens (Lindl.) Rchb.f.**

Status: EX?  
Distribution: Nyanga  
Site: Honde  
Habitat: Moist forest; epiphyte  
Fringe subpopulation recorded in Honde (1971), but has never been rediscovered during surveys at that locality. Reported to be known also from South Africa. Could be extinct in Zimbabwe.

**Polystachya subumbellata P.J.Cribb & Podzorski**

Status: VU D2  
Endemism: Near-endemic  
Distribution: Eastern Highlands  
Site: Vumba eastern end of Engwa farm, Chimanimani, Banti Forest  
Habitat: Moist forest; epiphyte  
Montane evergreen forest, at 1,200 m. Self-pollinating. Often flowers do not open, but may open at night.

**Satyrium flavum la Croix**

Status: VU D2  
Endemism: Near-endemic  
Distribution: Eastern Highlands  
Site: Mount Peza, Nyanga  
Habitat: Grassland  
Montane grassland. Altitude of 2,000 m. Described in 1993. Number of plants unknown.

**Satyrium mirum Summerh.**

Status: VU D2  
Endemism: Endemic  
Threats: Afforestation  
Distribution: Chimanimani  
Site: Tank Nek (between Cashel—Chimanimani), Himalaya Range, Fandara in Cashel (Chimanimani)  
Habitat: Grassland—Quartzite  
In moorland grassland along a ridge. Described in 1996 at 1,800 m. Known only from the type collection. Land is mainly owned by Forestry Commission. Threat from forestry especially pine plantations. Area is not easily accessible.

**Schizochilus cecilii Rolfe subsp. cecilii**

Status: VU D2  
Endemism: Endemic

Distribution: Nyanga  
Site: Inyanga Fort  
Habitat: Grassland  
Shallow soils in mountain grassland above 1,500 m.

***Stolzia compacta* P.J.Cribb subsp. *purpurata* P.J.Cribb**

**Status:** VU D2  
Endemism: Near-endemic  
Distribution: Eastern Highlands  
Site: Himalaya Range  
Habitat: Moist forest  
Associated with *Podocarpus latifolius*. Inconspicuous plant. No horticultural value. Inaccessible habitat so far.

***Tridactyle bicaudata* (Lindl.) Schltr.**

**Status:** EN B1B2c  
Threats: Agriculture  
Distribution: Central Watershed, Rusitu Valley  
Site: Mazvikadei dam, Miami, Haroni valley  
Habitat: Moist woodland; epiphyte  
Found on hilltops and hill miombo, in *Brachystegia* woodland. Habitat not easily accessible. Commercial agriculture is a threat. The species *T. latifolia* sensu BOLL was sunk under *T. bicaudata* (Lindl.) Schltr. from West Africa.

***Tridactyle trimikeorum* Dore**

**Status:** VU D2  
Endemism: Endemic  
Threats: Habitat degradation  
Distribution: Chimanimani, Limpopo Escarpment  
Site: Chimanimani, Limpopo-Escarpment—Bukwa  
Habitat: Moist woodland  
*Bukwa* subpopulation is healthy, Chimanimani population not. Unusual distribution. Last collected in 1998.

***Vanilla polylepis* Summerh.**

**Status:** EN D  
Threats: Collection  
Distribution: Eastern Highlands  
Site: Vumba, Chimanimani (Bundi Gorge)  
Habitat: Moist forest  
Generally old over Africa. Very scattered and erratic distribution. Healthy subpopulations are fragmented. A climber and not utilised.

## PASSIFLORACEAE

***Adenia fruticosa* Burt Davy subsp. *simplicifolia* W.J.de Wilde**

**Status:** VU D1  
Distribution: Limpopo/Save Lowveld, Limpopo Escarpment  
Site: Between Mutare, Birchenough and Mwenezi  
Habitat: Dry woodland  
Found in about ten habitats. Plants are scattered in their distribution. Also recorded in South Africa.

***Adenia spinosa* Burt Davy**

**Status:** VU D1  
Distribution: Limpopo/Save Lowveld  
Site: Between Beitbridge and Tuli/Shashi rivers, near Limpopo River, along Umzingwane River and other smaller rivers in Gwanda District  
Habitat: Rocky

## PERIPLOCACEAE

***Periploca nigrescens* (Afzel.) Bullock**

*Parquetina nigrescens* (Afzel.) Bullock  
**Status:** CR D  
Threats: Habitat degradation  
Distribution: Limpopo/Save Lowveld  
Site: Runde River, Gonarezhou National Park  
A lion. Only known from a dying locality. Also in West Africa. Only one plant seen.

## PHORMIACEAE

***Dianella ensifolia* (L.) DC.**

**Status:** VU D2  
Threats: Collection  
Distribution: Rusitu Valley  
Site: Haroni-Makurupini  
Habitat: Moist forest  
Also recorded in Modogoscior.

## POACEAE

***Oreobambos buchwaldii* K.Schum.**

**Status:** EN C2a  
Threats: Mining  
Distribution: Limpopo Escarpment—Buchwa  
Site: Bukwa Mountain  
Habitat: Moist woodland  
Significant number of plants destroyed in mining operation.

## POLYPODIACEAE

***Platyterium alcorni* Desv.**

**Status:** EX  
Threats: Collection, agriculture  
Distribution: Rusitu Valley  
Site: Pungwe River, Haroni forest  
Habitat: Moist forest  
Could not be found there again.

## PROTEACEAE

***Protea neocrinita* Beard**

**Status:** VU D2  
Endemism: Endemic?  
Distribution: Chimanimani  
Site: Chimanimani  
Habitat: Grassland—Quartzite  
Very restricted in Chimanimani. Further investigation is needed. Possibly not endemic to Chimanimani and may occur in Molawi and Mozambique.

## PTERIDACEAE

***Acrostichum aureum* L.**

**Status:** CR B1B2abcdC2b  
Threats: Habitat degradation  
Distribution: Limpopo/Save Lowveld  
Site: Chisekele Reserve (Chiredzi Springs)  
Habitat: Wetland  
Only one subpopulation in Zimbabwe at Chisekele Reserve. Speculated that it is a relict. A coastal or mangrove coastal swamp species. Now found alongside the springs. A specially protected mangrove fern in Zimbabwe. Reserve close to rural settlement. Well-represented outside Zimbabwe.

***Aleuritopteris welwitschii* (Baker) Ching**

**Status:** EN A2cC2aD1  
Threats: Grazing  
Distribution: Central Watershed  
Site: Ngomokurira  
Habitat: Rocky  
Pressure is the same as for *Selaginella purpusilla*. High human population density is a threat. Also in various southern African countries.

***Pellaea angulosa* (Bory ex Willd.) Baker**

**Status:** VU D2  
Threats: Afforestation  
Distribution: Chimanimani  
Site: Mount Peni  
Area owned by forestry companies. Pine plantations a threat. In various southern African countries and Modogoscior.

## RUBIACEAE

***Canthium ngonii* Bridson**

**Status:** VU B1B2dD  
Endemism: Near-endemic  
Distribution: Rusitu Valley, Chimanimani  
Site: Makurupini, Burma Valley  
Habitat: Moist woodland  
Low altitude forest outliers. Ecotonal species. Very little habitat.

***Chasalia parvifolia* K.Schum. var. *Bridson* ined.**

**Status:** VU D1D2  
Distribution: Chimanimani  
Site: Makurupini Forest  
Habitat: Moist forest  
On the back of Chimanimani, close to the Mozambique side. Localised in distribution and rare. Also known from Molawi and Mozambique.

***Coffea ligustroides* S.Moore**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Chirinda  
Site: Chirinda forest  
Habitat: Moist forest  
Fairly common in Chirinda forest.

***Coffea mufindiensis* Bridson var. *australis***

**Status:** VU D2  
Endemism: Near-endemic  
Distribution: Vumba  
Site: Bunga Forest Reserve  
Habitat: Moist forest  
Limited distribution extending into Molawi and Mozambique.

***Coffea zanguebariae* Lour.**

**Status:** EN D  
Endemism: Near-endemic  
Threats: Habitat degradation  
Distribution: Zambezi Lowveld  
Site: Rusape River mouth near Zambezi  
Habitat: Dry forest  
Threatened by people living there. Difficult to find.

***Gardenia imperialis* K.Schum.**

**Status:** CR D  
Threats: Agriculture  
Distribution: Vumba  
Site: Zimbabwe/Mozambique border  
Habitat: Moist forest  
Known from one locality in lowland riparian forest at the Mozambique border. Found on a commercial form. Extremely widespread throughout Africa.

***Gardenia posoquerioides* S.Moore subsp. *imperialis***

**Status:** VU D2  
Distribution: Chirinda  
Site: Chirinda forest, Chipinge  
Habitat: Moist forest  
Not very common but not rare either, not highly threatened. Also recorded in Kenya and elsewhere.

***Multidentia exserta* Bridson subsp. *exserta***

**Status:** VU B1B2cD2  
Distribution: Chirinda, Nyanga  
Site: Inyangani, south of Chirinda forest  
Habitat: Moist forest  
On the lower slopes of Inyangani. The other locality is south of forest. Is an ecotonal species between the woodland and forest edge.

***Pavetta mulleri* Bridson**

**Status:** VU D2  
Endemism: Endemic  
Distribution: Nyanga?  
Site: Sengwa Gorge  
No known threat. Altitude: 1,300–1,500 m.

***Psydrax obovata* (Eckl. & Zeyh.) Bridson subsp.**

***elliptica* Bridson**  
**Status:** VU D2



Distribution: Eastern Highlands  
 Site: Mutare, Watsomba  
 Habitat: Moist forest  
*Possibly also from Gonarezhou National Park.*

***Pyrostria bibracteata* (Baker) Cavaco**  
**Status: VU B1B2cD2**  
 Threats: Collection  
 Distribution: Rusitu Valley  
 Site: Haroni-Makurupini  
 Habitat: Moist forest  
*Ecotonal species.*

***Rytigynia umbellulata* (Hiern) Robyns**  
**Status: CR D**  
 Threats: Agriculture  
 Distribution: Rusitu Valley  
 Site: Makurupini forest  
 Habitat: Moist forest

***Tricalysia accocantheroides* K.Schum.**  
**Status: VU D2**  
 Distribution: Eastern Highlands  
 Site: Stapleford (at the top)  
 Habitat: Moist forest  
*Areo inaccessible and therefore safe.*

## RUTACEAE

***Vepris drummondii* Mendonça**  
**Status: VU D2**  
 Endemism: Near-endemic?  
 Distribution: Eastern Highlands, Rusitu Valley  
 Site: Mount Pene, Glencoe Forest Reserve, Haroni-Makurupini Forest along Makurupini River, Haroni—Timbiri River confluence, above hydro-dam on bank of Chambuka River in Tarka Forest Reserve, Mermaids Grotto, near Mubangazi River  
 Habitat: Moist forest  
*Not very common. Is a small shrub. Possibly in Mozambique.*

***Zanthoxylum davyi* (I.Verd.) P.G.Waterman**  
**Status: EN D**  
 Distribution: Eastern Highlands  
 Site: Mutare, Banti forest  
 Habitat: Moist forest  
*Only seen twice. One subpopulation is safe and the other is threatened. Also known from South Africa and elsewhere.*

***Zanthoxylum gillettii* (De Wild.) P.G.Waterman**  
**Status: VU D2**  
 Distribution: Chirinda  
 Site: Chirinda forest  
 Habitat: Moist forest  
*Uncommon in Chirindo.*

## SAPINDACEAE

***Allophylus chaunostachys* Gilg**  
**Status: VU D2**  
 Distribution: Chimanimani, Rusitu Valley  
 Site: Tarka, Rusitu forests  
 Habitat: Moist forest  
*Also found in South Africa and elsewhere.*

***Allophylus chirindensis* Baker f.**  
**Status: VU B1B2cD2**  
 Endemism: Endemic?  
 Threats: Habitat degradation  
 Distribution: Eastern Highlands  
 Site: Chirinda forest, Vumba, Burma Valley  
 Habitat: Moist forest  
*Possibly also in Mozambique. Medium altitude evergreen forest. Infrequent, outliers are vulnerable.*

***Erythrophysa transvaalensis* I.Verd.**  
**Status: VU D2**  
 Distribution: Central Watershed, Limpopo Escarpment  
 Site: Bulawayo, Gwanda  
 Habitat: Dry woodland

*Habitat not in a protected area though it is not in any danger of extinction. The species is not collected at all.*

***Pancovia golungensis* (Hiern) Exell & Mendonça**  
**Status: CR D**  
 Distribution: Eastern Highlands, Rusitu Valley  
 Site: Burma Valley, Rusitu  
 Habitat: Moist forest

## SAPOTACEAE

***Chrysophyllum viridifolium* J.M.Wood & Franks**  
**Status: VU D2**  
 Distribution: Chirinda  
 Site: Chirinda forest  
 Habitat: Moist forest  
*Not very common. Scattered trees.*

***Manilkara concolor* (Harv. ex C.H.Wright) Gerstner**  
**Status: VU D1D2**  
 Distribution: Limpopo/Save Lowveld  
 Site: South of Lundi Gonarezhou National Park  
 Habitat: Dry woodland  
*Dry river beds, scattered on river sand and alluvium. Widespread in the area. Danger from elephants not a problem at the moment. Habitat specialised, but its potential habitat is large.*

***Synsepalum kaessneri* (Engl.) Pennington**  
**Status: VU D2**  
 Threats: Collection  
 Distribution: Rusitu Valley  
 Site: Haroni-Makurupini  
 Habitat: Moist forest  
*Fairly common.*

## SCROPHULARIACEAE

***Buchnera granitica* S.Moore**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Central Watershed  
 Site: Harare  
 Habitat: Moist woodland  
*Occurs on granite soils; known only from type specimen.*

***Hebenstretia oatesii* Rolfe subsp. *inyangana* Roessler**  
**Status: VU D2**  
 Endemism: Endemic  
 Distribution: Nyanga  
 Site: Mount Inyangani summit ridge  
 Habitat: Grassland  
*High montane grasslands.*

***Jamesbrittenia zambesiaca* (R.E.Fr.) Hilliard**  
**Status: CR B1B2c**  
 Endemism: Endemic  
 Distribution: NW Zimbabwe  
 Site: Victoria Falls  
 Habitat: Rocky  
*Known only from the type. Known from crevices of dry rock along the edge of the gorge some distance below Victoria Falls.*

***Selago serpentina* Hilliard**  
**Status: VU B1B2cD2**  
 Endemism: Endemic  
 Distribution: Great Dyke (S)  
 Site: Ngesi; south of Selukwe; Mtilikwe (?) near Otto Mine  
 Habitat: Grassland—Serpentine  
*Also found on a granitic hillack at Mtilikwe Communal Land.*

## SELAGINELLACEAE

***Selaginella perpusilla* Baker**  
**Status: VU D2**  
 Distribution: Limpopo/Save Lowveld

Site: Lundi River Bridge  
 Habitat: Rocky  
*Widespread on granite. Area subject to much mist. Probably a remnant of a wider distribution. It is likely to be rare. Also recorded in East and Central Africa, Madagascar and DRC.*

## ULMACEAE

***Celtis mildbraedii* Engl.**  
**Status: VU D2**  
 Distribution: Chirinda  
 Site: Chirinda forest  
 Habitat: Moist forest  
*Very common in Chirindo, rare in other countries.*

## VERBENACEAE

***Clerodendron incisum* Klotzsch**  
**Status: CR B1B2cD**  
 Threats: Agriculture  
 Distribution: Rusitu Valley  
 Site: Haroni-Rusitu junction  
 Habitat: Moist forest  
*Locality subjected to dramatic land-use change. It is suspected that this is the only locality. Only one individual seen in transition woodland-submontane grassland ecotone, at an altitude of 1,525–1,830 m. Possibly also occurs in northern Chimanimoni.*

## VIOLACEAE

***Rinorea arborea* (Thouars) Baill.**  
**Status: CR B1B2bcD2b**  
 Threats: Habitat degradation, agriculture  
 Distribution: Rusitu Valley  
 Site: Rusitu forest  
 Habitat: Moist forest  
*Dolerite specialist. Small forest tree. Not utilised. Historically a narrow distribution in Zimbabwe.*

***Rinorea elliptica* (Oliv.) Kuntze**  
**Status: CR B1B2bcD**  
 Threats: Habitat degradation, soil erosion  
 Distribution: Limpopo/Save Lowveld  
 Site: Along Runde Gonarezhou National Park  
 Habitat: Moist forest  
*Fewer than ten plants from one locality known; the locality is highly threatened as a result of river bank erosion. Elephants pose a threat.*

***Rinorea ilicifolia* (Welw. ex Oliv.) Kuntze**  
**Status: CR D**  
 Threats: Collection  
 Distribution: Rusitu Valley  
 Site: Haroni-Makurupini  
 Habitat: Moist forest  
*One of the rare plants in Haroni forest.*

## VITACEAE

***Cyphostemma masukuense* (Baker) Desc. ex Wild & R.B.Drumm.**  
**Status: VU D2**  
 Distribution: Chirinda, Rusitu Valley  
 Site: Chirinda, Makurupini  
 Habitat: Moist forest

## VITTARIACEAE

***Vittaria elongata* Sw.**  
**Status: EN B1B2aC2a**  
 Threats: Collection  
 Distribution: Rusitu Valley  
 Site: Haroni  
 Habitat: Moist forest  
*This is a coastal species which has been intensively collected. Locals collect plants, it is seriously threatened. Old World Tropics.*

*Vittaria ensiformis* Sw.

Status: EN B1B2aC2a

Threats: Collection

Distribution: Rusitu Valley

Site: Harani

Habitat: Moist forest

Same locality as *Vittaria elongata*, on the same trees but fewer numbers than *V. elongata*. Also recorded from Mauritius, southeast Asia, Australia and Tanzania.

## ZAMIACEAE

*Encephalartos chimanimaniensis* R.A.Dyer & I.Verd.

Status: EX

Threats: Collection

Distribution: Chimanimani

Habitat: Grassland—Quartzite

Initially very rare and critically endangered. It was only known from a single site in the catchment of a river.

Recent field surveys have been unable to locate more individuals. The species appears to have been wiped out by collectors.

*Encephalartos concinnus* R.A.Dyer & I.Verd.

Status: EN A1acdB1B2cdC2a

Endemism: Endemic

Threats: Collection

Distribution: Limpopo Escarpment

Habitat: Dry woodland

Was said to be abundant and producing canes on north-facing slope of a known locality in 1968. Two colonies, with five individuals each, were recorded north of an important river. Highly threatened by collectors.

*Encephalartos manikensis* (Gilliland) Gilliland

Status: EN A1acdC2a

Threats: Afforestation, agriculture, collection

Distribution: Eastern Highlands

Habitat: Grassland

In 1995, 5,000 plants were estimated to exist in the wild. Several accounts of local extinctions are known. Threatened by collectors.



Quartzite ridges of the northern Chimanimani. (Photo: J. Timberlake)



# LOWER RISK

## ACANTHACEAE

**Anisotes bracteatus** Milne-Redh.

**Status:** LR-nt

**Distribution:** Widespread

*Reported to have a wide distribution throughout Zimbabwe. No further information is available.*

**Barleria molensis** Wild

**Status:** LR-lc

**Endemism:** Endemic

**Distribution:** Great Dyke (S)

**Site:** About 1 km north of Ngezi Dam at Lalapanzi turn-off, Mhlaba Hill in Chivu, Lalapanzi Chrome Mine in Chirimhanzu, Sebakwe National Park, Ngezi-Battlefields Road in Kadoma

**Habitat:** Grassland—Serpentine

*Prefers low rainfall. Been collected several times. Grows in open deciduous bushland, stony slopes.*

## ALOACEAE

**Aloe inyangensis** Christian

**Status:** LR-nt

**Endemism:** Endemic

**Threats:** Collection

**Distribution:** Eastern Highlands

**Site:** Escarpment summit between the Nyanga dawns, Inyangani mountains, Vumba (Castle Beacon), North of Nyanga village, Mtarazi Falls, between Nyanga and Mutare, Chimanimani

**Habitat:** Rocky

*Widely distributed in the Nyanga area. Occurs in rocky areas where plants are protected from fire.*

## ANACARDIACEAE

**Ozoroa longepetiolata** R. & A.Fern.

**Status:** LR-lc

**Endemism:** Endemic

**Threats:** Mining

**Distribution:** Great Dyke (N)

**Habitat:** Grassland—Serpentine

*Very common in the north. Has not been seen in the south. Land is not arable. Plant is extremely abundant.*

**Rhus lucens** Hutch.

**Status:** LR-nt

**Distribution:** NW Zimbabwe

**Site:** Kariba Gorge, Victoria Falls, Matetsi area?

**Habitat:** Dry woodland

*Dry forest/woodland. Few individuals were found at each location.*

**Rhus tenuipes** R. & A.Fern.

**Status:** LR-lc

**Endemism:** Endemic

**Distribution:** Great Dyke (S)

**Site:** Shabane, Mashava

**Habitat:** Grassland—Serpentine

*Found on some areas just around the Dyke. Thin-leaved species.*

**Rhus tomentosa** L.

**Status:** LR-lc

**Distribution:** Nyanga

**Site:** Pungwe source

**Habitat:** Grassland

*Above 1,800 m.*

**Rhus tumicola** S.Moore

**Status:** LR-lc

**Distribution:** Eastern Highlands

**Site:** Chimanimani, Nyanga

*Rare at both localities.*

**Rhus wildii** R. & A.Fern.

**Status:** LR-lc

**Endemism:** Endemic

**Distribution:** Great Dyke (N)

**Site:** Mpinga Pass, Vanad Pass, Nyanyetsi Estate

**Habitat:** Grassland—Serpentine

*Exposed chrome ridges. A rare dwarf shrub up to 1,2 m tall. There are five specimens in SRGH, three of which are from Vanad Pass.*

## ANNONACEAE

**Artabotrys monteiroae** Oliv.

**Status:** LR-lc

**Distribution:** Nyanga, Vumba

**Site:** Nyanga-Vumba forest

**Habitat:** Moist forest

*In medium altitude forest areas.*

**Uvaria gracilipes** N.Robson

**Status:** LR-nt

**Threats:** Browsing

**Distribution:** Limpapa/Save Lowveld

**Site:** Chilo rock cliff, Gonarezhou National Park

**Habitat:** Dry woodland

*Dry forest thicket. Elephants damage the habitat.*

**Xylopia odoratissima** Oliv.

**Status:** LR-lc

**Distribution:** NW Zimbabwe

**Site:** Kazuma Pan

**Habitat:** Dry woodland

*Kalahari sands. Scattered over a large area. Area formally protected.*

## APIACEAE

**Centella obtriangularis** Cannon

**Status:** LR-nt

**Endemism:** Endemic

**Distribution:** Chimanimani

**Site:** Chimanimani

**Habitat:** Grassland—Quartzite

*Quartzite endemic. Widespread. Found on wet grassy slopes or banks.*

## APOCYNACEAE

**Strophanthus nicholsonii** Holmes

**Status:** LR-lc

**Distribution:** Widespread

**Site:** Hurungwe, Hwange, Nyanga (N)

**Habitat:** Dry woodland

*Widespread.*

**Wrightia natalensis** Stapf

**Status:** LR-lc

**Distribution:** Limpapa/Save Lowveld

**Site:** Save Valley, Ganarezhou National Park

**Habitat:** Dry woodland

## ASCLEPIADACEAE

**Brachystelma discoideum** R.A.Dyer

**Status:** LR-nt

**Distribution:** Central Watershed

**Site:** Luveve Cemetery Road, Gweru Teacher's College grounds, Glencurragh Farm in Nyamandlovu

*In South Africa it is only known from a slate pan north of Pretoria.*

**Huernia procumbens** (R.A.Dyer) L.C.Leach

**Status:** LR-lc

**Distribution:** Limpopa/Save Lowveld

**Habitat:** Dry woodland

*Grows in Andrastachys habitats. Not in any danger.*

**Huernia volkartii** Peitsch ex Werderm. & Peitsch var. *volkartii*

**Status:** LR-lc

**Distribution:** Chimanimani, Limpapa Escarpment

**Site:** Kyle Dam, Buchwa Mountain, Chimanimani

**Habitat:** Moist woodland

*Restricted distribution. Fairly safe from threats.*

**Huernia zebrina** N.E.Br.

**Status:** LR-lc

**Distribution:** Limpapa/Save Lowveld

**Site:** Near Tuli along the Limpapa, up to the Nuanetsi

**Gorge:** near Buffala Bend

**Habitat:** Dry woodland

*Very scattered distribution.*

**Pachycymbium keithii** (R.A.Dyer) L.C.Leach

**Status:** LR-lc

*Occurs in a wide range of habitats. Commonly*

*overlooked species.*

**Pachycymbium schweinfurthii** (A.Berger)

**M.G.Gilbert**

*Caralluma schweinfurthii* (Berger)

**Status:** LR-lc

**Distribution:** NW Zimbabwe

**Site:** Lukosi River and upper Kariba Basin

**Habitat:** Dry woodland

*Restricted distribution but certainly not threatened.*

**Raphionacme chimanimaniana** Venter & R.L.Verh.

**Status:** LR-lc

**Distribution:** Chimanimani

**Site:** Musapa Gap area

**Habitat:** Grassland—Quartzite

*Known from only two specimens from Chimanimani.*

*Probably moderately widespread. Also known from the Limpopo Province in South Africa. There could be more species of Raphionacme from Chimonimani.*

**Stapelia gettiffei** R.Pott

**Status:** LR-nt

**Distribution:** Limpopo/Save Lowveld

**Site:** Along the Save, Limpapa and Shashe Rivers

**Habitat:** Dry woodland

*Occurs sporadically growing under bushes.*

**Stapelia kwebensis** N.E.Br.

**Status:** LR-lc

**Threats:** Habitat degradation

**Distribution:** Limpopo/Save Lowveld

**Site:** Save Valley, around Nyanyadzi

*Not threatened.*

**Trachycalymma graminifolius** (Wild) Goyder

*Pachycarpus graminifolius* Wild

**Status:** LR-nt

**Endemism:** Endemic

**Distribution:** Chimanimani

**Site:** Chimanimani

**Habitat:** Grassland—Quartzite

*Rare places at an altitude of 2,400 m.*

## ASPLENIACEAE

**Asplenium sebungweense** J.E.Burrows

**Status:** LR-nt

**Endemism:** Near-endemic?

**Threats:** Mining

**Distribution:** Zambezi Lowveld

**Site:** Gokwe, Charama plateau, Busi River, Kove River

**Gorge:**

**Habitat:** Dry forest

*Fairly limited distribution in Zambia and Zimbabwe*

(about 100 km radius) but probably widespread. Coal mining is a threat. Found in Zambia, and also possibly in Angola and DRC.

## ASTERACEAE

### *Anisopappus chinensis* (L.) Hook.f. & Arn. subsp. *lobatus* (Wild.) Ortiz & Paiva

*Anisopappus dentatus* (DC.) Wild subsp. *lobatus* Wild

**Status:** LR-nt

Endemism: Endemic

Distribution: widespread

Site: Makoni

Common and widespread on granite hills. No additional information available.

### *Anisopappus chinensis* (L.) Hook.f. & Arn. subsp. *paucidentatus* Ortiz & Paiva

**Status:** LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Altitude higher than 1,500 m. Fairly widespread on the Chimonimonis.

### *Athrixia fontinalis* Wild

**Status:** LR-lc

Endemism: Endemic

Distribution: Eastern Highlands

Site: Chimanimani, Nyanga

Habitat: Grassland

Shallow soil in montane grassland above 1,500 m.

### *Dicoma nicalifera* De Wild.

**Status:** LR-lc

Endemism: Near-endemic

Distribution: Central Watershed, Great Dyke (N)

Site: Inyati, Shurugwi, Mutare, Ngezi Dam 1 km north of Lalapanzi turn-off, Murial Mine, Sengwa Game Reserve, Kingston Hill in Bindura, Umtebeka/Umtebekwana rivers, Mpingi Pass, Shamva Road, Tipperary Claims, Mtorashanga Pass at foot of Ndumba Hill at Inyati, Hurungwe

Habitat: Grassland—Serpentine

Numerous localities. Mostly on serpentine soils with a high nickel value; also found on non-serpentine soils.

### *Helichrysium acervatum* S.Moore

**Status:** LR-lc

Endemism: Endemic

Distribution: Eastern Highlands

Site: Nyanga Pungwe View Point in Nyanga, Mount Inyangani, Nyanga Troutbeck Circular Drive overlooking Pungwe Valley, Nyanga Mare Dam Road, Mount Peza, Nyanga Pungwe source, Mount Musapa in Chimanimani

Habitat: Grassland

Common in the Nyanga area.

### *Helichrysium chasei* Wild

**Status:** LR-lc

Endemism: Endemic

Distribution: Eastern Highlands

Habitat: Grassland

Grassland habitat. Widespread but restricted to the Eastern Highlands.

### *Helichrysium granitica* Wild

**Status:** LR-nt

Endemism: Endemic?

Distribution: Central Watershed, Limpopo Escarpment—Matopos

Site: Matopos, Harare

Habitat: Rocky

Confined to granite hills. Not recorded outside Zimbabwe but unlikely to be an endemic. Extremely widespread.

### *Helichrysium rhodellum* Wild

**Status:** LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Apparently widespread in Chimanimani.

### *Helichrysium spencerianum* Wild

**Status:** LR-nt

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite. Widespread.

### *Humea africana* S.Moore

**Status:** LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Fairly widespread and common on an altitude of about 1,700 m and higher.

### *Nidarella resedifolia* DC. subsp. *serpentinicola* Wild

**Status:** LR-lc

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Nora Mine in Mutorashanga, Vanad Pass near

Janwella Farm in Mvurwi Mountains

Habitat: Grassland—Serpentine

### *Vernania accamodata* Wild

**Status:** LR-lc

Endemism: Endemic

Distribution: Great Dyke

Site: Mpingi Pass, Gath Mine, Windsor Chrome Mine,

Otta Mine, Kildanan, Rodcamp Mine, Mashava Mine

Habitat: Grassland—Serpentine

Grows spontaneously on chrysotile asbestos mine dumps. Scattered distribution.

### *Vernonia bainesii* Oliv. & Hiern subsp. *wildii* (Merxm.) Wild

*Vernonia wildii* Merxm.

**Status:** LR-lc

Endemism: Endemic

Distribution: Great Dyke (N), Central Watershed

Site: Vanad Pass, Rusape, Nyanga

Habitat: Moist woodland, grassland

Grassland, on granite or serpentine soils and also in miombo woodland.

### *Vernonia eyeslii* S.Maare

**Status:** LR-lc

Endemism: Endemic

Distribution: Eastern Highlands, Limpopo Escarpment

Site: Chimanimani, Forest Hill Kap, Papoteke River

gorge, Rusape, Zimunya, Kyle

Habitat: Moist woodland

Granite hills and associated sandveld.

### *Vernonia muelleri* Wild subsp. *muelleri*

**Status:** LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Habitat: Moist woodland, Moist Forest

Occurs in evergreen forest and adjacent woodlands, at an altitude of 500–1,250 m. Not endemic to quartzite. Habitat is very restricted, but is more open and possibly disturbed. There may have been a possible change in population. It is an ecotonal species.

### *Vernonia nepetifolia* Wild

*Vernonia gracilipes* var. *minor* S.Moore

**Status:** LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Mount Peza and Mount Peni

Habitat: Grassland

Quartzites and sandstones. Common around 1,526 m.

Rocky slopes, on quartzite and an Umkanda sandstones.

## BALSAMINACEAE

### *Impatiens salpinx* Launert

**Status:** LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

In shade and watercourses. It is locally common.

## BLECHNACEAE

### *Blechnum ivahibense* C.Chr.

**Status:** LR-lc

Distribution: Eastern Highlands

Site: Nyanga, Mount Peni

Mozambique, Zimbabwe, Madagascar, Kenya, Tanzania.

## BUDDLEJACEAE

### *Buddleja pulchella* N.E.Br.

**Status:** LR-nt

Distribution: Central Watershed

Site: Diana's Vaw, Mutare

Habitat: Moist woodland

Widespread. Only in higher rainfall areas on granite hills. Limited distribution range in foothills. Under a threat.

## CELASTRACEAE

### *Maytenus heterophylla* (Eckl. & Zeyh.) N.Rabsan subsp. *puberula* N.Rabsan

*Gymnosarea matopensis* M.Jordaan

**Status:** LR-lc

Endemism: Endemic

Distribution: Limpopo Escarpment-Matopos

Site: Matopos and Bulalima Mangwe districts

Habitat: Dry woodland

Occurs on granite in fringing forests. Endemic to

Matopos. Habitat wide. Common in the area; a substantial part of the population occurs in a protected area. Not utilised.

### *Maytenus axycarpa* N.Rabsan

**Status:** LR-lc

Distribution: Limpopo/Save Lawveld

Site: Tswiza, Mwenzi

Habitat: Dry woodland

Has a narrow distribution, but also occurs in South

Africa. Habitat unspecific. No changes in its habitat.

Has a restricted distribution. Taxonomic status probably pending.

### *Maytenus pubescens* N.Rabsan

**Status:** LR-lc

Distribution: Limpopo/Save Lawveld

Site: Rupisi, Malipati

Habitat: Dry woodland

No known threat.

## CONVOLVULACEAE

### *Convolvulus ocellatus* Hook.f. var. *placiternivus* Verdc.

**Status:** LR-lc

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Where Mvurwi range cross Harare-Lusaka road,

Vanad Pass, Mtorashanga Pass, Ruorka Ranch, 15 km

south of Mhlaba Hills, Harseshoe Mine, Vanad Pass,

Ngezi Battlefields Road on Grassland in Kadama,

Rodcamp Mine in Lamagundi

Habitat: Grassland—Serpentine

Open grassland. Very common.



***Merremia xanthophylla* Hall.f.**  
**Status: LR-lc**  
 Distribution: Central Watershed  
 Site: Mount Darwin, Mhlaba hills, Mutare  
 Habitat: Grassland

## CRASSULACEAE

***Kalanchoe velutina* Welw. ex Britten subsp. *chimanimanensis* (R.Fern.) R.Fern.** 1  
*Kalanchoe chimanimanensis* R.Fern.  
**Status: LR-nt**  
 Endemism: Endemic  
 Distribution: Chimanimani  
 Site: Chimanimani Mountains  
 Habitat: Grassland—Quartzite  
 Grows among rocks on slopes of mountains.

## CUPRESSACEAE

***Widdringtonia nodiflora* (L.) Pawrie**  
**Status: LR-lc**  
 Threats: Fire  
 Distribution: Eastern Highlands  
 Site: Inyanga, Chimanimani  
 Habitat: Moist forest  
 In its habitat, it is very common. Affected by fire/ utilised? But really is not threatened. Growth form makes it undestroyable.

## CYATHEACEAE

***Cyathea capensis* (L.f.) Sm.**  
**Status: LR-lc**  
 Distribution: Eastern Highlands  
 Site: Meikles, Chizungu  
 Habitat: Moist forest  
 Very localised in Zimbabwe. Stable forest edge habitats. Extremely common and well-represented throughout the southern and east African region.

***Cyathea dregei* Kunze**  
**Status: LR-nt**  
 Threats: Collection  
 Distribution: Eastern Highlands, Limpopo Escarpment—Matopos  
 Habitat: Grassland  
 Not considered threatened in Zimbabwe.

***Cyathea manniana* Haak.**  
**Status: LR-nt**  
 Distribution: Nyanga, Vumba  
 Habitat: Moist forest  
 A tree fern.

## ERICACEAE

***Erica lanceolifera* S.Moore**  
**Status: LR-lc**  
 Endemism: Endemic?  
 Distribution: Chimanimani  
 Site: Bundi River (Mountain Hut), Outward Bound School, foot of Sphinx Pass, Bundi Head Waterfalls, Nyamhanya River—Martin Forest Reserve, Greenmount Farm, Mount Peni, Tarka Forest Reserve, Kasipi, Tilbury Estate, Bridal Veil Falls  
 Habitat: Grassland—Moist woodland  
 May also occur in Tonzonio but there is no concrete proof as the one specimen that was seen at Kew may not have come from Tonzonio. Chimonimoni endemic in montane grassland and woodland. It has a very wide distribution.

***Erica pleiotricha* S.Maore var. *pleiotricha***  
**Status: LR-nt**  
 Endemism: Endemic  
 Distribution: Chimanimani  
 Site: Chimanimani

Habitat: Grassland—Quartzite  
*Quartzite endemic. In damp places among rocks near the summit of mountains. Common on the summits.*

***Erica pleiotricha* S.Maore var. *blaeriodes* (Wild) R.Rass**  
**Status: LR-nt**  
 Distribution: Chimanimani  
 Site: Musapa  
 Habitat: Grassland—Quartzite  
 Frequently collected in Mozambique.

***Erica wildii* Brenan**  
**Status: LR-nt**  
 Endemism: Endemic  
 Distribution: Chimanimani  
 Site: Chimanimani  
 Habitat: Grassland—Quartzite  
*Quartzite endemic. Widespread and common. In upland, savanna and amongst rocks.*

***Erica waadii* Bolus**  
**Status: LR-lc**  
 Endemism: Endemic  
 Distribution: Eastern Highlands  
 Site: Inyanga, Chimanimani  
 Habitat: Grassland  
 Found at high altitudes (> 1,900 m), and is common in Inyanga and Chimonimoni in grassland and often by streams. Sporadic distribution.

## ERIOCAULACEAE

***Mesanthemum africanum* Maldenke**  
**Status: LR-nt**  
 Endemism: Near-endemic  
 Distribution: Chimanimani  
 Site: Chimanimani  
 Habitat: Grassland—Quartzite  
 Altitude 1,200 m to the top of the mountain. Three citations in Flora zambesiaca.

## ERIOSPERMACEAE

***Eriospermum phippisii* Wild**  
*Eriospermum mackenii* (Hook.f.) Baker subsp. *phippisii* (Wild) Perry  
**Status: LR-nt**  
 Endemism: Endemic  
 Distribution: Chimanimani  
 Site: Upper Bundi plain, Musapa gap near Martin Forest Reserve, Chikukwa's Kraal near Mountain Forest Reserve, Club Hut  
 Habitat: Grassland—Quartzite  
*Quartzite, grassland. Fairly widespread. Altitude higher than 1,700 m.*

## EUPHORBACEAE

***Alchornea hirtella* Benth.**  
**Status: LR-nt**  
 Distribution: Eastern Highlands  
 Site: Chirinda, Nyanga, Makurupini  
 Habitat: Moist forest  
 Not under any threat. Habitat on steep slopes. Widespread geographically, throughout the more humid parts of Tropical Africa.

***Clusia punctata* Wild**  
**Status: LR-nt**  
 Endemism: Endemic  
 Distribution: Chimanimani  
 Site: Summit of "uncontoured peak", Mawenje slopes  
 Habitat: Grassland—Quartzite  
*Quartzite endemic. Montane grassland among quartzite crags on rocky summits and steep slopes, therefore habitat restricted. Similar to Clusia abyssinica, but is completely globular.*

***Euphorbia caeperi* N.E.Br. ex A.Berger var. *calidicola* L.C.Leach**  
**Status: LR-lc**  
 Distribution: Zambezi Lowveld  
 Habitat: Dry woodland  
 Known from Sebungwe, Hwange and the Zambezi River Valley.

***Euphorbia gossypina* Pax subsp. *mangulensis* S.Carter**  
**Status: LR-nt**  
 Endemism: Endemic  
 Distribution: Central Watershed  
 Site: Mhangura  
 Not threatened. Known from northern Zimbabwe.

***Euphorbia griseola* Pax subsp. *griseola***  
**Status: LR-lc**

***Euphorbia griseola* Pax subsp. *maschanica* L.C.Leach**  
**Status: LR-lc**  
 Distribution: Central Watershed  
 Widespread in central and northern parts of Zimbabwe.

***Euphorbia guerichiana* Pax**  
**Status: LR-nt**  
 Distribution: Limpopo/Save Lowveld  
 Fairly widespread but not common in southern and western Zimbabwe in scattered colonies.

***Euphorbia malevala* L.C.Leach subsp. *malevala***  
**Status: LR-lc**  
 Distribution: Widespread  
 Widely distributed throughout Zimbabwe.

***Euphorbia persistentifolia* L.C.Leach**  
**Status: LR-lc**  
 Distribution: Zambezi Lowveld, Limpopo/Save Lowveld  
 Site: Zambezi Valley

***Euphorbia schinzii* Pax**  
**Status: LR-lc**  
 Distribution: Central Watershed  
 Site: Matopos, Bulawayo  
 Habitat: Dry woodland  
 Widely distributed throughout Zimbabwe. Several taxa have been given this blanket name.

***Euphorbia wildii* L.C.Leach**  
**Status: LR-nt**  
 Endemism: Endemic  
 Threats: Collection, mining  
 Distribution: Great Dyke (N)  
 Site: Mutorashanga Pass, west of Kildonan, Ruorka Ranch, Umvukwes Mountains  
 Habitat: Grassland—Serpentine  
 Locally abundant. Risk from collectors not too serious, but sensitive to chrome mining. Regeneration is good.

***Phyllanthus serpentinicola* Radcl.-Sm.**  
**Status: LR-lc**

Endemism: Endemic  
 Distribution: Great Dyke (S)  
 Site: Moodies Pass, 3 km south of Chivi Village, Hendrik's Pass  
 Habitat: Grassland—Serpentine  
 Serpentine soils on slopes, with chrome seams. Altitude 1,200 m. Very much like *Phyllanthus maderaspatensis* but is a suffrutescent with small (< 1.5 X 1 cm) obovate leaves. It is extremely abundant.

## FLACOURTIACEAE

***Scopia stoltzii* Gilg ex Sleumer**  
**Status: LR-nt**  
 Distribution: Eastern Highlands  
 Site: Burma, Chirinda, Vumba, Nyanga  
 Habitat: Moist forest  
 In riverine forest. Medium altitude. A rare tree in forest patches.

## GRAMMITIDACEAE

*Cachlidium serrulatum* (Sw.) L.E.Bishop

Status: LR-nt

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni

Habitat: Moist forest

Grows on racks in the river—looks like mass. Not well-protected. Near the Mozambican border. Port of the forest has disappeared. Also in Madagascar.

## HIPPOCRATEACEAE

*Hippocratea pallens* Planch. ex Oliv.

Status: LR-nt

Threats: Collection, agriculture

Distribution: Chirinda, Rusitu Valley

Site: Haroni-Rusitu, Chirinda forest

Habitat: Moist forest

Fairly common in the two forests.

*Hippocratea valenskii* Laes.

Status: LR-ic

Distribution: Rusitu Valley, Zambezi Lowveld

Site: Haroni-Rusitu, Forest near Zambezi escarpment

Habitat: Moist forest

A forest climber.

## LAMIACEAE

*Hemizygia flabellifolia* S.Maare

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. About 1,500 m altitude. Seems to be widespread and fairly common.

*Hemizygia aritrephe* Wild

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Mountains south of Mount Peza, Runde valley, Bundi River, Summit of Peak above Haroni River, below Mountain Hut, edge of Bundi River in Bundi Valley

Habitat: Grassland—Quartzite

Quartzite endemic. Common and widespread. Said to be locally common on mountains south of Mount Pezo.

*Leucas aggerestris* (Wild) Sebald

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Mpinga Pass, Nyamunyeche Estate, Mono Mine which is 12 km north of Mutorashanga, Mutorashanga, Rod Camp Mine, Caesars Pass, where Harare-Lusaka road crosses Mvurwi (Umvukwes) Range, Birkdale Pass

Habitat: Grassland—Serpentine

Scattered throughout northern Great Dyke. Several sites.

*Plectranthus caudatus* S.Maare

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani—Quartzite

Habitat: Rocky

Quartzite endemic, above 1,000 m. Widespread.

*Plectranthus parphyranthus* T.J.Edwards & N.Crauch

Status: LR-ic

Endemism: Endemic

Distribution: Limpopo Escarpment—Kyle, Matopos

Site: Richmond Farm, Harare Rd, 4 km from Masvingo; 10 km east of Kyle Dam; Matopos, Besa Kobila Farm.

Habitat: Moist forest

Found in xerophytic plant communities on granite lithosols, often in association with *Myrothamnus flabellifolia*, *Selaginella dregei* and *Crassula* species.

## LEGUMINOSAE: CAESALPINIOIDEAE

*Azafia quanzensis* Welw.

Status: LR-ic

Threats: Forestry exploitation

Distribution: Widespread

Site: Lowveld, Bulawayo, Matopos, Gakwe

Habitat: Dry woodland

Below 600 m altitude. Very common tree in the lowveld.

Less common in Bulawayo. Desirable timber tree, used by farmers and an commercial basis. Does not coppice.

Stays deciduous for a long time. Found in oroble and non-arable areas.

*Baikiaea plurijuga* Harms

Status: LR-nt

Threats: Forestry exploitation

Distribution: NW Zimbabwe

Habitat: Dry woodland

Grows in Kolahari sands. Very common in the area.

Coppices regularly. A desirable commercial timber.

Timber size has been exploited heavily in the past.

## LEGUMINOSAE: MIMOSOIDEAE

*Acacia chariessa* Milne-Redh.

Status: LR-ic

Endemism: Endemic

Distribution: Central Watershed

Site: Mvuma to Bulawayo, Mashava Hills, Ngezi, Mashava, Windsor Chrome Mine, Chivu

Habitat: Dry woodland

Widespread usually found on red, shallow soils at

altitudes greater than 1,000 m. Common on serpentine

soil but also on other soil types.

## LEGUMINOSAE: PAPILIONOIDEAE

*Aeschynomene aphylla* Wild

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Widespread.

*Aeschynomene chimanimaniensis* Verdc.

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Restricted distribution in Zimbabwe, more common in

Mozambique.

*Aeschynomene gazensis* Baker f.

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Moist woodland

Only base of the Chimanimani, not on quartzite. Known

from only a few localities.

*Aeschynomene grandistipulata* Harms

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Rocky

Quartzite endemic. Fairly widespread from the top to

the base of the mountain, and fairly common.

*Aeschynomene inyangensis* Willd.

Status: LR-nt

Endemism: Near-endemic

Distribution: Eastern Highlands

Site: Nyanga and Chimanimani

Habitat: Grassland

On quartzite and Umkondo formations. Common on

dolerite. Montane habitat, altitude 1,300–2,500 m. On

the Gondwano Plateau and also at the base.

*Cratalaria phyticaides* Wild

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Not scarce on quartzite. Widespread.

*Dalbergia melanaxylon* Guill. & Perr.

Status: LR-nt

Distribution: Widespread

Habitat: Dry woodland

Habitat is heavy soil but fairly widespread. Coppices

fairly regularly. Flowers and fruits from coppice growth

in three years. Young plants from seeds also common.

Exploitation in Zimbabwe is not particularly high. Wide

African distribution.

*Indigofera serpentinicola* Schire

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke

Habitat: Grassland—Serpentine

*Latonis serpentinicola* Wild

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke (S)

Site: Birkdale pass, Lomagundi

Habitat: Grassland—Serpentine

*Pearsonia metallifera* Wild

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke (N & S)

Site: Chivu, Mpinga, Mutorashanga,

Habitat: Grassland—Serpentine

Serpentine soils. Found in huge patches. Five localities

are known.

*Pteracarpus angalensis* DC.

Status: LR-nt

Threats: Forestry exploitation

Distribution: Widespread

Habitat: Dry woodland, moist woodland

Widespread in Zimbabwe. Habitat is much smaller than

that of *Baikiaea plurijuga*. Coppices well—there are

more juveniles than adults. Secondary colonizer, often

accompanied by other plants. Heavily exploited in the

last 40 years. Widespread and well represented outside

Zimbabwe.

*Rhynchosia stipata* Meikle

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Dragon's Tooth

Habitat: Grassland—Quartzite

Quartzite endemic. Recorded only on the Zimbabwean

side of the mountains, but rumoured to also exist in

Mozambique. Grows on quartzite crags. Fairly

widespread.

## LOBELIACEAE

*Labelia cobaltica* S.Maare

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Rocky

Quartzite endemic. Prefers rocky places, in crevices,

gullies, in shade and sheltered conditions.

## LOMARIOPSIDACEAE

*Bolbitis gemmifera* (Hieron.) C.Chr

Status: LR-nt

Distribution: Rusitu Valley

Site: Haroni Forest



Habitat: Moist forest; epiphyte  
Widespread in Central Africa.

**Elaphoglossum deckenii** (Kuhn) C.Chr.  
**Status:** LR-lc  
Distribution: Nyanga  
Site: Mount Inyangani  
Habitat: Moist forest; epiphyte  
This is a mountain specialist. Rarest species of the genus in Africa? Altitude: 1,900–2,000 m. Safe locality. Also in East Africa.

**Elaphoglossum marojejyense** Tardieu  
**Status:** LR-lc  
Distribution: Eastern Highlands  
Site: Mount Inyangani, Chimanimani  
Habitat: Moist forest  
Rare, high altitude species. Habitats not threatened. Also in Madagascar.

**Lomariopsis warneckei** (Hieron.) Alston  
**Status:** LR-nt  
Distribution: Eastern Highlands  
Site: Aberfoyle Tea Estates, Chirinda  
Creeping rhizome. Very rare, never widespread. Does not produce readily from spores. Extremely widespread species on and off the African mainland.

MALVACEAE

**Hibiscus gwandensis** Exell  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Limpopo/Save Lowveld  
Site: Beitbridge, Buby Crossing (west of Mateke hills), Murungudzi  
Habitat: Dry woodland  
Among syenite rocks. Near *Hibiscus meyeri* and *H. okavangensis* but geographically far removed from both and differing in the length of the style-branches.

MELASTOMATACEAE

**Dissotis pulchra** A. & R.Fern.  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Chimanimani  
Habitat: Grassland—Quartzite  
Quartzite endemic. Along streams. Locally common along streams, sometimes in rock crevices.

**Pseudosbeckia swynnertonii** (Baker f.) A. & R.Fern.  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Chimanimani  
Habitat: Grassland—Quartzite  
Quartzite endemic. Rocky slopes, Brachystegia woodland and along rivers. Found on rocky slopes on high to lower altitudes. Occupies a wide range.

MORACEAE

**Ficus exasperata** Vahl  
**Status:** LR-nt  
Threats: Agriculture  
Distribution: Rusitu Valley  
Site: Haroni-Makurupini-Rusitu, possibly Vumba  
Habitat: Moist forest

ORCHIDACEAE

**Bolusiella maudiae** (Bolos) Schltr.  
**Status:** LR-nt  
Threats: Collection, habitat degradation  
Distribution: Eastern Highlands  
Site: Vumba  
Habitat: Moist forest; epiphyte

Riverine forest and woodland in high rainfall areas; rare. The species has probably been overlooked. It is a small epiphyte (twig epiphyte) with very small white flowers. Occurs in small or large colonies (50–100 observed once) as a thin blanket.

**Cheirostylis gymnochiloides** (Ridl.) Rchb.f.  
**Status:** LR-lc  
Threats: Collection, agriculture  
Distribution: Rusitu Valley  
Site: Rusitu  
Habitat: Moist forest  
Primitive orchid. Widespread but rare, in low numbers throughout its range. Does not multiply. Is a self-pollinator. Riverine forest. In KwoZulu-Notal (South Africa) in dune forest. Flowers from August to September.

**Corymborkis corymbis** Thouars  
**Status:** LR-lc  
Distribution: Chirinda  
Site: Chirinda forest  
Habitat: Moist forest  
Occurs in lowland forests. Flowers in February. Known from very few places in Zimbabwe. Generally not collected. May be threatened in many parts of its range. Primitive orchid, a self-pollinator. Widespread in many countries.

**Cynorkis anisoloba** Summerh.  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Eastern Highlands  
Site: Nyanga Mountains, Tarka Forest Reserve, Chambuka River, Haroni-Makurupine Forest, Mtarazi Falls, Rhodes Inyanga Experiment Station, Pungwe Falls in Nyanga, Mount Nyangani southern slopes near Nyazengu Falls, Digby's Pool, Mount Nuza, Mubangazi River in Chimanimani, Outwa  
Habitat: Grassland—Wetland  
Known from many collections. A conspicuous and rare orchid. Habitat generalist. In damp or wet ground, in rock crevices or among short grasses, sometimes in deep shade. Altitude: 1,350–1,700 m.

**Disa rhodantha** Schltr.  
**Status:** LR-nt  
Threats: Habitat degradation  
Distribution: Nyanga  
Site: Inyangani Mountains  
Habitat: Grassland  
Wet grassland, a very restricted habitat. Widespread in South Africa, and it appears to be distinct from Zimbabwean population, but too little material to determine. Disjunct. Generally scarce. Possibly a distinct subspecies, but poorly known at this stage. Flowers December to February.

**Eulophia macrantha** Rolfe  
**Status:** LR-nt  
Endemism: Near-endemic  
Distribution: Central Watershed  
Site: Chipoli farm in Shamva  
Habitat: Moist forest  
Saprophyte known only from Molowi (Zimbo) and Zimbabwe. Was collected in 1958 from a locality in Chipoli Farm in Shamva. More data required. Often associated with bomboos.

**Habenaria singularis** Summerh.  
**Status:** LR-lc  
Endemism: Endemic  
Distribution: Eastern Highlands, Central Watershed  
Site: Chimanimani, Cleveland area near Harare, Gokwe  
Habitat: Dambo  
North, Central and Eastern Zimbabwe. In dombos and grassland, altitude of 1,500 m. Endemic to the Eastern Highlands and the watershed plateau near Harare (Cleveland). The species may also occur in Gokwe.

**Habenaria subaequalis** Summerh.  
**Status:** LR-lc  
Endemism: Endemic

Distribution: Eastern Highlands, Central Watershed  
Site: Domboshava Hill at Goromonzi, Engwa, Chimanimani Range, Mutare, Troutbeck, North Downs, Nyanga  
Habitat: Grassland—Wetland  
Damp submontane or plateau grassland, usually in marshy ground, almost always amongst rocks. Habitat threatened. Known from several localities from eastern highlands, on the highest plateau.

**Herschelianthe chimanimaniensis** (H.P.Linder) H.P.Linder  
*Herschelia chimanimaniensis* H.P.Linder  
**Status:** LR-nt  
Endemism: Near-endemic  
Distribution: Chimanimani  
Site: Chimanimani  
Habitat: Grassland—Quartzite  
Grows on the eastern Chimanimani quartzites. Habitat specific. Restricted to quartzites.

**Holothrix macowaniana** Rchb.f.  
**Status:** LR-nt  
Distribution: Eastern Highlands  
Site: Mount Nuzi in Stapleford, Chimanimani  
Habitat: Grassland  
Grasslands. Flowers in August to October. Also in Eastern Cape forests, South Africa. The taxonomic identity needs checking.

**Liparis chimanimaniensis** G.Will.  
*Liparis* sp. No. 1.  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Chimanimani  
Site: West of Point 71  
Habitat: Grassland—Quartzite  
Quartzite endemic. Well-drained rocky slopes in montane zone. Altitude of 2,000 m. Known only from type locality. Can easily be overlooked because of its size (5 cm tall). Inaccessible habitat.

**Platylepis glandulosa** (Lindl.) Rchb.f.  
**Status:** LR-lc  
Distribution: Nyanga  
Habitat: Moist forest  
A swamp forest species. Flowers in December to February. East, West and Tropical Africa.

**Polystachya phirii** Fiebeck  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Limpopo Escarpment  
Site: Buchwa, Bikita and surrounds  
Habitat: Moist woodland  
Severely fragmented because it prefers hilltops above 900 m. Communal land is on the lowlands. Mining could be a future threat.

**Polystachya valentina** la Croix & P.J.Cribb  
**Status:** LR-nt  
Endemism: Endemic  
Threats: Fire  
Distribution: Chimanimani  
Site: Mount Peza  
Habitat: Grassland—Quartzite  
Quartzite, mountain slopes. Ground orchid found in grass. Widespread over the Chimanimani plateau. Altitude: 1,480–1,800 m. No horticultural threats. Minimal threat to both species and habitat.

PASSIFLORACEAE

**Adenia karibaensis** W.J.de Wilde  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Zambezi Lowveld  
Site: Kariba Gorge, Musingwa River in Mavuradonha Mountains, Bumi Escarpment, Rukowakova Escarpment in Gurube, Chenanga Camp in Gurube, Zambezi Escarpment  
Habitat: Dry woodland  
Endemic to Kariba, south of the Lake. Also along the

*Zambezi Escarpment. Described in 1971. Confined to rocky savanna. Quite a few habitats where it is possibly found. Relatively inaccessible*

***Bersama swynnertonii* Baker f.**

**Status: LR-lc**

Endemism: Endemic

Distribution: Eastern Highlands

Site: Ngungunyawa Forest Reserve, Chiredza Gorge Forest in Chipinge, Edge of the Vumba forest, Chirinda Forest, T. Meikle Forest Research station in Stapleford, Chipete Forest Patch Forest in Chipinge, Orange Grove in Chimanimani

Habitat: Moist forest

*In patches of evergreen forest, especially at edges and in kloof forest and riverine forest.*

## POACEAE

***Danthoniopsis chimanimaniensis* (Phipps)**

**W.D.Clayt.**

**Status: LR-nt**

Endemism: Near-endemic

Distribution: Chimanimani

Habitat: Grassland—Quartzite

*Has a wide altitudinal range from the base of the mountain up to 1,600 m.*

***Eragrostis desolata* Launert**

**Status: LR-nt**

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

*Montane grasslands. 1,120–1,680 m.*

## POLYPODIACEAE

***Microsorium pappei* (Kuhn) Tardieu**

**Status: LR-lc**

Distribution: Vumba, Nyanga

Site: Penhalonga, Vumba

Habitat: Moist forest

*Is rare throughout its range. Probably not more widespread as reported in the literature.*

## PROTEACEAE

***Protea enervis* Wild**

**Status: LR-nt**

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

*Moderately high altitude, but widespread.*

## RUBIACEAE

***Canthium oligocarpum* Hiern subsp. *angustifolium* Bridson**

**Status: LR-nt**

Endemism: Near-endemic

Distribution: Nyanga

Site: Nyanga, Chimanimani

Habitat: Moist forest

*Fairly limited. High altitude. Rare plant, but well-protected in its natural habitat. Better protected but much rarer than *Canthium racemosum*.*

***Canthium racemosum* S.Moore var. *racemosum***

**Status: LR-nt**

Threats: Habitat degradation

Distribution: Limpopo/Save Lowveld

Site: South of Chipinge, Chipinda Pools, Save-Runde Junction area, Gonarezhou National Park

Habitat: Dry woodland

*Same as it occurs in communal land. Widely distributed. Possibly in Malawi, also in Mozambique.*

***Lasianthus kilimandscharicus* K.Schum.**

**Status: LR-lc**

Distribution: Nyanga

Site: Mount Inyangani, Chimanimani

Habitat: Moist forest

*Is well-represented outside Zimbabwe. Is fairly limited in Zimbabwe.*

***Leptactina delagoensis* K.Schum. subsp. *delagoensis***

**Status: LR-lc**

Distribution: Limpopo/Save Lowveld

Site: Tambahata, Save/Runde Junction

*Very common in Mozambique. Also in South Africa.*

***Pauridiantha symplocoides* (S.Moore) Bremek.**

**Status: LR-lc**

Distribution: Eastern Highlands

Site: Stapleford

Habitat: Moist forest

*Found high up at 2,000 m in Stapleford. In high altitude forest in inaccessible areas.*

***Pavetta comostyla* S.Moore var. *comostyla***

**Status: LR-nt**

Endemism: Endemic

Distribution: Eastern Highlands

Site: Chimanimani, Chirinda forest, Chipinge

Habitat: Moist forest

*Altitude of 1,100–1,500 m.*

***Pavetta comostyla* S.Moore var. *inyangensis***

**(Bremek.) Bridson**

**Status: LR-lc**

Endemism: Near-endemic

Distribution: Eastern Highlands

Site: Vumba Mountain, Mount Inyangani in Nyanga, Mutare Heights, Chimanimani, Chirinda Forest, on top of Honzo Kop in Tsonzo

Habitat: Moist forest

*An understory tree. Altitude: 1,100–1,800 m.*

***Rytigynia macrura* Verdc.**

**Status: LR-nt**

Distribution: Vumba

Site: Bunga, Leopard Rock

Habitat: Moist forest

*High altitude forests are better protected than the low altitude ones. Where observed, it was seen in large numbers.*

## RUTACEAE

***Teclea fischeri* (Engl.) Engl.**

**Status: LR-nt**

Threats: Habitat degradation

Distribution: Zambezi Lowveld

Site: Gokwe, Kanyemba

Habitat: Dry forest

*Known only from dry forest patches in Gokwe*

*Konyembe. Habitat under severe threat with people settling here. Could be widespread.*

## SANTALACEAE

***Thesium bundiense* Hilliard**

**Status: LR-nt**

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

*Quartzite endemic. Similar distributions to the other Thesium species. Possibly more Thesium species endemic to the Chimonimonis.*

***Thesium chimanimaniense* Brenan**

**Status: LR-nt**

Endemism: Endemic

Distribution: Chimanimani

Site: Bonde River, Airfield

Habitat: Grassland—Quartzite

*Quartzite endemic. Open grassland. Similar distribution to other Thesium species. Possibly more Thesium species endemic to the Chimonimonis.*

***Thesium dolichomeres* Brenan**

**Status: LR-nt**

Endemism: Endemic

Distribution: Chimanimani

Site: Summit of Skeleton Pass, Ben Nevis, Bundi River, Martin's Forest Reserve, Upper Haroni, Mountain Hut, 'Stonehenge'

Habitat: Grassland—Quartzite

*Quartzite endemic. Widespread in the mountains on dry quartzite rocky slopes. Similar distribution to the other Thesium species. Possibly additional Thesium species endemic to the Chimonimonis.*

## SAPINDACEAE

***Aporrhiza nitida* Gilg**

**Status: LR-nt**

Distribution: Rusitu Valley

Site: Makurupini

Habitat: Moist forest

*Common in outliers at low altitude up to 1,000 m.*

***Blighia unijugata* Baker**

**Status: LR-nt**

Threats: Habitat degradation

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

*Infrequent and very vulnerable in the outliers. A protected species in South Africa.*

***Deinbollia xanthocarpa* (Klotzsch) Radlk.**

**Status: LR-nt**

Distribution: Zambezi Lowveld, Limpopo/Save Lowveld

Site: Gokwe, Sabi valley

Habitat: Dry forest

*Grows in riverine forest.*

***Filicium decipiens* (Wight & Arn.) Thwaites**

**Status: LR-nt**

Distribution: Rusitu Valley

Site: Makurupini forest

Habitat: Moist forest

*Common in outliers at low altitude up to 1,000 m.*

***Stadmannia oppositifolia* Poir. subsp. *rhodesiaca***

**Exell**

**Status: LR-nt**

Distribution: Limpopo/Save Lowveld

Habitat: Dry woodland

*Throughout the lowveld on hills. A scarce plant in eastern Zimbabwe.*

## SAPOTACEAE

***Manilkara discolor* (Sond.) J.H.Hemsl.**

**Status: LR-nt**

Distribution: Limpopo/Save Lowveld

Site: Gonarezhou National Park

Habitat: Dry forest

*Is a forest species. Distributed wider than *Manilkara concolor*.*

***Sideroxylon inerme* L. subsp. *diospyroides* (Baker) J.H.Hemsl.**

**Status: LR-nt**

Distribution: Limpopo/Save Lowveld

Site: Gonarezhou National Park

Habitat: Moist woodland

*Common in this habitat.*

***Vitellariopsis ferruginea* Kupicha**

**Status: LR-nt**

Endemism: Endemic

Distribution: Limpopo Escarpment



Site: About 15 km south of Mutare on Dara Farm on road to Chimanimani near Bushman's paintings and grain storage bins boulders, Magahane Hill in Bikita, Bushman's summit in Zimunya Reserve, Chirenga Ruins near Matendere in Buhera, steep slope of Mhandambiri  
Habitat: Rocky  
Granite hills, among racks. Large habitat. Very common.

## SCROPHULARIACEAE

### *Antherothamnus pearsonii* N.E.Br.

**Status:** LR-lc  
Distribution: Limpopo Escarpment—Matopos  
Habitat: Rocky  
Possibly more localities. Widespread. No real threats.

### *Jamesbrittenia carvalhoi* (Engl.) Hilliard

**Status:** LR-lc  
Endemism: Near-endemic  
Distribution: Eastern Highlands  
Site: Inyanga (Trautbeck); Pungwe Hills; Vumba Mountains; Mount Peza  
Habitat: Grassland  
Occurs at an altitude of 1,370–2,285 m. Grassland in open mountain slopes or in scrubs above streams and on forest margins. Easily regenerates after fire.

### *Jamesbrittenia fodina* (Wild) Hilliard

*Sutera fodina* Wild  
**Status:** LR-lc  
Endemism: Endemic  
Distribution: Great Dyke (N & S)  
Site: Rod Camp Mine, Makande; Sebakwe; Mpinge Pass; Park, Kwekwe; Mhindamukova Pass, Chivi; Ruorka Ranch; Mhlaba Hills near Windsor Chrome Mine  
Habitat: Grassland—Serpentine  
Occurs on serpentine soils at an altitude of 1,200–1,680 m. Flowering is recorded during most months. Often associated with disturbances.

### *Jamesbrittenia myriantha* Hilliard

**Status:** LR-lc  
Endemism: Endemic  
Distribution: Zambezi Lowveld  
Site: Sebungwe District (Zambezi River); near Binga; Gakwe District (Sengwa Research Station); Gweru District (Gwela)  
Habitat: Wetland  
Known from several localities in western and northwestern Zimbabwe. Known from drying mud along riverbank. It is sometimes regarded as a marsh weed.

### *Selago anatrachota* Hilliard

**Status:** LR-lc  
Endemism: Near-endemic  
Distribution: Chimanimani  
Site: Stonehenge, Long Gully, Bundi  
Habitat: Grassland—Quartzite  
Favours rocky areas in scrub. Roughly 1,700–1,800 m.

### *Selago swynnertonii* (S.Moore) Hilliard var. *swynnertonii*

**Status:** LR-lc  
Endemism: Near-endemic  
Distribution: Nyanga  
Site: Nyahadi River; Inyangani (Jairei River road crossing; Odzani River Valley)  
Habitat: Grassland  
Ranges from Inyangani to Melsetter. Found in grassland between 1,500–2,600 m. Flowers throughout most of the year.

## SELAGINELLACEAE

### *Selaginella imbricata* (Forssk.) Spring ex Decne.

**Status:** LR-lc  
Distribution: Zambezi Lowveld  
Site: Zambezi Valley  
Habitat: Rocky  
Confined to basalts and associated geology. Is rare. *Poikilohydrous*—shrivels up in winter, therefore could have been overlooked. Habitat is resilient.

## THYMELAEACEAE

### *Struthiola montana* Peterson

**Status:** LR-nt  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Close to summit of Turret Towers  
Habitat: Grassland—Quartzite  
Quartzite endemic. Grows on high ridges, therefore limited in distribution. Said to be occasional.

### *Struthiola rhodesiana* Peterson

**Status:** LR-nt  
Endemism: Endemic  
Distribution: Eastern Highlands  
Site: Pungwe Falls and Hills, Nyanga Downs, Bundu Valley, 'Stonehenge' Plateau, Mount Peza, Mave River, summit of Point 71, Chimanimani Airfield  
Habitat: Grassland  
Recorded only from Chimanimani and Nyanga.

## ULMACEAE

### *Celtis gomphophylla* Baker

**Status:** LR-lc  
Distribution: Chirinda, Rusitu Valley  
Site: Makurupini, Chirinda  
Habitat: Moist forest

## VELLOZIACEAE

### *Xerophyta argentea* (Wild) L.B.Sm. & Ayensu

*Vellazia argentea* Wild  
**Status:** LR-nt  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Mount Peza, 'Stonehenge'

Habitat: Rocky  
Widespread within the locality.

## VIOLACEAE

### *Rinorea convallarioides* (Baker f.) Eyles

**Status:** LR-nt  
Threats: Habitat degradation  
Distribution: Eastern Highlands  
Site: Chirundi, Makurupini, Vumba  
Habitat: Moist forest  
Outliers in Vumba are under threat.

### *Rinorea ferruginea* Engl.

**Status:** LR-nt  
Threats: Habitat degradation  
Distribution: Eastern Highlands  
Site: Chirundi, Makurupini, Vumba  
Habitat: Moist forest  
Outliers at Vumba are under threat.

## VITACEAE

### *Cissus petiolata* Hook.f.

**Status:** LR-nt  
Threats: Collection  
Distribution: Rusitu Valley  
Site: Harani-Makurupini  
Habitat: Moist forest  
Uncertain.

### *Cissus producta* Afzel.

**Status:** LR-nt  
Threats: Collection  
Distribution: Rusitu Valley  
Site: Harani-Makurupini  
Habitat: Grassland  
Uncertain.



Wooded grassland and old workings for chromite in veins on the Great Dyke. (Photo: J. Timberlake)

## ACANTHACEAE

***Acanthopale pubescens* (Lindau) C.B.Cl.**  
Status: DD

***Barleria aromatica* Oberm.**  
Status: DD

Endemism: Endemic?  
Distribution: Great Dyke (S)  
Site: Unspecified localities (Grassland and near Mutare).  
Habitat: Grassland—Serpentine  
*Reported to be common on the soils of the Great Dyke. However, the taxonomic integrity of this species is uncertain, as it may be a synonym. No information available. Also possibly known from Zombio.*

***Blepharis drummondii* Vollesen**  
Status: DD  
Endemism: Endemic  
Distribution: Limpopo/Save Lowveld  
Site: Fishans (Gonarezhou National Park)

***Brillantaisia pubescens* Oliv. var. *pubescens***  
Status: DD

***Dyschoriste capricornis* C.B.Clarke**  
Status: DD

***Dyschoriste pilifera* Hutch.**  
Status: DD

***Hygrophila cataractae* S.Moore**  
Status: DD

***Mellera nyassana* S.Moore**  
Status: DD

***Mellera submutica* C.B.Cl.**  
Status: DD

***Pseudocalyx saccatus* Radlk.**  
Status: DD

***Ruellipsis setosa* (Nees) C.B.Clarke**  
Status: DD  
Endemism: Near-endemic?

***Sclerochiton coeruleus* (Lindau) S.Moore**  
Status: DD

***Thunbergia petersiana* Lindau**  
Status: DD

***Thunbergia reticulata* Hochst. ex Nees**  
Status: DD

***Thunbergia schimbensis* S.Moore**  
Status: DD  
Endemism: Near-endemic?

***Thunbergia subulata* Lindau**  
Status: DD

## ALOACEAE

***Aloe munchii* Christian**  
Status: DD  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Chimanimani  
Habitat: Grassland—Quartzite

***Aloe musapana* Reynolds**  
Status: DD  
Endemism: Endemic  
Distribution: Chimanimani (N)

Site: Musapa Mountain, Groenkoep  
Habitat: Grassland—Quartzite?  
*Grows on sheer rock surfaces out of reach of fire, in full sun.*

## AMARYLLIDACEAE

***Scadoxus puniceus* (L.) Friis & Nardal**  
Status: DD  
Distribution: Limpopo Escarpment—Matopos  
*Known from Matopos.*

## ASCLEPIADACEAE

***Brachystelma furcatum* C.Boele**  
Status: DD  
Endemism: Endemic  
Distribution: Limpopo Escarpment—Matopos  
Site: Matopos District, Longsdale, Matopos Research Station  
Habitat: Dry woodland  
*Known only from the type collection (1959) from mopone woodland in very saline soil.*

***Brachystelma hirtellum* Weim.**  
Status: DD  
Distribution: Nyanga  
*Very scarce in Zimbabwe.*

***Brachystelma lancasteri* C.Boele**  
Status: DD  
Endemism: Endemic  
Distribution: Central Watershed  
Site: In the vicinity of the Bulawayo Station in the direction of Victoria Falls; 20 km east of Bulawayo  
Habitat: Grassland  
*Found in open grassland. The species appears to be confined to a small area in and around Bulawayo.*

***Brachystelma punctatum* C.Boele**  
Status: DD  
Endemism: Endemic  
Distribution: Central Watershed/Northwest Zimbabwe  
Site: Chegutu District, Poole Farm; Hwange  
Habitat: Moist woodland, Dry woodland  
*Two colour forms are reported (yellow-green and moroon with yellow dots). Found in Julbernardia woodland where it is fairly uncommon.*

***Duvalia polita* N.E.Br. var. *polita***  
Status: DD  
Habitat: Dry woodland  
*In river valleys at low altitudes on brack soils with mopone or Acacia species.*

***Hoodia lugardii* N.E.Br.**  
Status: DD  
Habitat: Dry woodland  
*Very restricted distribution.*

***Huernia hystrix* N.E.Br. var. *hystrix***  
Status: DD  
Distribution: Limpopo/Save Lowveld  
Site: Save/Runde Junction. Also in Buhera District  
Just extends into Zimbabwe. Found in dry, rocky environments.

***Huernia kirkii* N.E.Br.**  
Status: DD  
Distribution: Limpopo/Save Lowveld  
Site: Save/Runde Junction  
*Very restricted distribution.*

***Huernia levyi* Oberm.**  
Status: DD  
Threats: Habitat degradation

Distribution: Zambezi Lowveld/Northwestern Zimbabwe  
Site: From Doma to Pandamatenga  
Habitat: Rocky  
*Very scattered distribution and known only from a few localities in dry rocky areas.*

***Huernia oculata* L.C.Leach & Plowes**  
Status: DD  
Endemism: Endemic  
Distribution: Limpopo Escarpment  
Site: Kyle, Mushonganeburi hill (Matibi Mission), Mnene Mission and Great Zimbabwe, Zaka and Ndanga, Hills between Mvuma and Masvingo  
Habitat: Dry woodland  
*This species grows under vegetation on the dwolos. No threats are evident here. Recorded only from Masvingo District.*

***Huernia verekeri* Stent var. *verekeri***  
Status: DD  
Distribution: Limpopo/Save Lowveld  
Site: Save Valley, around Nyanyadzi and Biriwiri  
Habitat: Dry woodland  
*Known to hybridise.*

***Neoschumannia cardinea* (S.Moore) Meve**  
*Swynnertia cardinea* S.Moore  
Status: DD  
Distribution: Chirinda  
Site: Chirinda forest  
Habitat: Moist forest  
*There is a relict population in Ngungunyono Forest Reserve. Specimens in SRGH were collected in 1976. Also known from Tanzania.*

***Orbea maculata* (N.E.Br.) L.C.Leach**  
Status: DD

***Orbea umbracula* (M.D.Hend.) L.C.Leach**  
Status: DD  
Endemism: Endemic  
Distribution: Eastern Highlands, Limpopo/Save Lowveld  
Site: Between Mutare and Masvingo, and Gonarezhou, Chese Rest Camp (Lomagundi), Marange, Banti Forest Reserve, Bikita, Guluene river (6 km north of Malunge pan in Nuanetsi), Dorowa, Moodies Pass  
*Found in a number of different habitats.*

***Orbeopsis gossweileri* (S.Moore) L.C.Leach**  
Status: DD  
Distribution: Central Watershed  
Site: Nyamandhlovu  
*Known only from a single individual. It is probably more widespread but has just been overlooked.*

***Pachycymbium lugardii* (N.E.Br.) M.Gilbert**  
Status: DD  
Distribution: NW Zimbabwe  
Site: Hwange District  
*Known only from a few collections in Zimbabwe.*

***Pachycymbium ubomboense* (I.Verd.) M.G.Gilbert**  
Status: DD  
Distribution: Chirinda, Limpopo Escarpment, Limpopo/Save Lowveld  
Site: Chirinda Forest, junction of Sabi and Lundi River, Gutu, Bukwa Mountain  
Habitat: Rocky  
*Very restricted habitat. In shaded stony ground.*

***Stapelia gigantea* N.E.Br.**  
*Stapelia cylista* C.A.Lückh.  
Status: DD  
Distribution: Limpopo/Save Lowveld  
Site: Save/Rundi Junction  
Habitat: Dry woodland  
*Just tips into the country. There is some doubt that this may be S. nobilis N.E.Br. which has been sunk; is*



separable from *S. gigantea* and should be given infraspecific status. *S. nobilis* is widespread on the granites in this area.

***Trachycalymma fimbriatum* (Weim.) Bullock**  
**Status: DD**  
 Endemism: Near-endemic?  
 Distribution: Nyanga  
 Site: Pungwe Hills  
 Also found on Molawi's Mount Mulonje.

## ASPLENIACEAE

***Asplenium gemmascens* Alston**  
**Status: DD**  
 Distribution: Chimanimani  
 Site: Mount Peni  
 Habitat: Moist forest  
 Known only from Molawi, Mozambique and Zimbabwe.

***Asplenium trichomanes* L.**  
**Status: DD**  
 Distribution: Nyanga  
 Site: Mount Inyangani on summit  
 Habitat: Grassland  
 This is the only Flora zambesiaca record for this species (in Zimbabwe). It co-occurs with *Asplenium ulighii* on the summit of Mount Inyangani.

***Asplenium ulighii* Hieron.**  
**Status: DD**  
 Distribution: Nyanga  
 Site: Mount Inyangani  
 Habitat: Grassland  
 Initially thought to be a depauperate form of *A. aethiopicum*. Associated with mountain peaks. 2,600 m. Widespread African distribution.

## ASTERACEAE

***Helichrysum serpentinicola* Wild**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Great Dyke (S)  
 Site: Shurugwi, Gweru, Ngezi Dam  
 Habitat: Grassland—Serpentine

***Nicolasia pedunculata* S.Moore subsp. *thermalis* Wild**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Zambezi Lowveld  
 Site: Binga hot springs  
 Habitat: Wetland  
 Seems to be endemic to the somewhat saline water of the Binga hot springs.

***Vernonia rhodesiana* S.Moore**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Central Watershed  
 Site: Miami  
 Habitat: Moist woodland  
 Known only from type locality.

## CRASSULACEAE

***Crassula cooperi* Regel var. *subnodulosa* R.Fern.**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Central Watershed  
 Site: Lomagundi, Mutare  
 Habitat: Moist woodland  
 In humus pockets among dolomite, granite or limestone boulders, on rocky outcrops in sheltered gullies and woodland.

***Crassula nodulosa* Schonland var. *nodulosa* forma *rhodesica* R.Fern.**  
**Status: DD**  
 Endemism: Endemic?

Distribution: Central Watershed, Limpopo Escarpment  
 Site: Macheke, Odzi, Nyoni Hills  
 Habitat: Grassland—Moist woodland  
 Grows in grassland, bushveld in rocky situations in mountains up to 2,200 m. May also occur outside Zimbabwe.

***Crassula setulosa* Harv. var. *setulosa* forma *latipetala* R.Fern.**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Chimanimani  
 Site: Mount Peni  
 Habitat: Rocky  
 Known only from the type specimen. A herb forming dense clusters at the top of rocky places.

***Kalanchoe lobata* R.Fern.**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Central Watershed  
 Site: Harare, near Mutare  
 Habitat: Moist woodland  
 Approaches *K. laciniata* by the indumentum, formed by more distinct glandular-headed hairs. Differs in length of calyx, shape and size of sepals, shape and size of corolla-tube and lobes.

***Kalanchoe wildii* Raym.-Hamet**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Limpopo Escarpment—Matopos  
 Site: Matobo District, Mnene Mission, Shurugwi  
 Habitat: Rocky  
 On rocks.

## CUCURBITACEAE

***Corallocarpus triangularis* Cogn.**  
**Status: DD**  
 Threats: Urban expansion  
 Distribution: Limpopo/Save Lowveld  
 Site: Beitbridge  
 Habitat: Dry woodland  
 Lost record of existence in wild 10 years ago, at which time the habitat was being adversely affected by building/development. Not recorded in Flora zambesiaca as occurring in Zimbabwe.

***Cucumis humifructus* Stent**  
**Status: DD**  
 Distribution: Central Watershed, Limpopo/Save Lowveld  
 Site: Matopos, Chegata  
 Habitat: Dry woodland  
 Deep sandy soils in oodvork habitats. Dependent on oodvork survival. Geocarpic fruit unique to family, maturing 15–30 cm underground. Regeneration dependent on fruit being dug up and eaten by oodvork.

## ERICACEAE

***Erica simii* (S.Moore) E.G.H.Oliv.**  
**Status: DD**  
 Endemism: Endemic?  
 Distribution: Nyanga  
 Habitat: Grassland  
 Low altitude at 1,500 m.

## ERIOCAULACEAE

***Eriocaulon matopoense* Rendle**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Central Watershed  
 Site: Besna Kobila Farm (Matopos), Mansala river-Shamva road junction (Harare), Rusape, Mermaid's Pool, Goromonzi and Nyanga, Nyamunyech Estate, Chikomba Vlei (Hurungwe), Marondera  
 Habitat: Wetland

Marshy ground and in shallow water of streams; 1,500 m.

***Eriocaulon wildii* S.M.Phillips**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Nyanga  
 Site: Van Niekerk ruins (Ngarawe River, Nyanga)  
 Habitat: Wetland  
 By river, wet sand; 1,220 m.

## ERIOSPERMACEAE

***Eriospermum cecilii* Baker**  
**Status: DD**  
 Endemism: Near-endemic  
 Distribution: Nyanga, Chimanimani  
 Site: Musapa Mountain, Pungwe falls, World's View, Troutbeck, Fort Hill

## EUPHORBIACEAE

***Croton madandensis* S.Moore**  
**Status: DD**  
 Distribution: Limpopo/Save Lowveld  
 Habitat: Dry woodland  
 In Zimbabwe in low dry southeast. Shrub or tree.

***Euphorbia monteiroi* Hook.f. subsp. *ramosa* L.C.Leach**  
**Status: DD**  
 Distribution: Central Watershed (W)  
 Habitat: Dry woodland  
 Scattered colonies in extreme western Zimbabwe along Botswana border.

***Euphorbia rowlandii* R.A.Dyer**  
**Status: DD**  
 Distribution: Limpopo/Save Lowveld  
 Site: Limpopo Valley, 30 km west of Pafuri  
 Habitat: Dry woodland  
 Very inaccessible and not visited by many people. Limited distribution in Zimbabwe. Known from outside Zimbabwe.

***Jatropha loristipula* Radcl.-Sm.**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Limpopo/Save Lowveld  
 Site: Beitbridge  
 Habitat: Dry woodland  
 In mopane-Combretum woodland. 305 m.

***Jatropha monroi* S.Moore**  
*Jatropha cervicornis* Suss.  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Central Watershed  
 Site: Marondera, Masvingo  
 Not recorded from elsewhere. The ecology data are not available. Known only from a few old collections such as at Fort Victoria 1909–1912 by Monro 2187 BM.

***Jatropha spicata* Pax**  
*Jatropha messinica* E.A.Bruce  
**Status: DD**  
 Distribution: Limpopo/Save Lowveld  
 Site: Sabi Experimental Station, Beitbridge  
 Habitat: Dry woodland  
 Well-represented outside Zimbabwe. Locally extremely common.

***Monadenium kimberleyana* G.Will.**  
**Status: DD**  
 Endemism: Endemic  
 Distribution: Limpopo/Save Lowveld  
 Site: Chisumbanje east (5 km north of Muembe and east of Rimbi)  
 Habitat: Dry forest  
 Apparently known only from the type locality. Often found in association with *Aloe suffulta*. 1,200 m.

Found in sandveld in thicket periphery. Appears to be restricted to southeastern Zimbabwe.

**Tragia mazoensis Radcl.-Sm.**

**Status:** DD  
Endemism: Endemic  
Distribution: Great Dyke (N)  
Site: Vanad Pass, Mutarashanga  
Habitat: Grassland—Serpentine  
Open treeless grossy hillsides, often on termite mounds.

## GESNERIACEAE

**Streptocarpus cyanandrus B.L.Burt**

**Status:** DD  
Endemism: Endemic  
Distribution: Nyanga  
Site: World's View, Dawns—Terrace Towers  
Habitat: Moist forest  
Under rack overhangs.

## ISOETACEAE

**Isaetes schweinfurthii A.Braun**

*Isaetes rhodesiana* Alston; *Isaetes alstonii* Reed & Verdc.  
**Status:** DD  
Distribution: Central Watershed  
Site: Zambezi Basin and wetlands, Nyamandhlovu  
Habitat: Wetland  
Taxonomy of this complex needs to be resolved. In Zimbabwe, it is also referred to as *I. rhodesiana* Alston or *I. alstonii* Reed & Verdc., considered by some to be endemic. Grows in open ponds.

## LEGUMINOSAE: PAPILIONOIDEAE

**Indigofera longepedunculata Gillett**

**Status:** DD  
Endemism: Endemic  
Distribution: Nyanga  
So far recorded only from Zimbabwe.

**Indigofera parviflora B.Heyne ex Wight & Arn.  
var. crispidula J.B.Gillett**

*Indigofera parviflorum* (Heyne ex Wight & Arn) Schrire  
**Status:** DD  
Endemism: Endemic  
Check the taxonomic status of this species.

**Indigofera seburgweensis Gillett**

**Status:** DD  
Endemism: Endemic  
Distribution: Zambezi Lowveld  
Site: Karingwe Hill, Lusulu (Binga)  
Habitat: Dry woodland  
Only one specimen was collected from Bingo. Grows on sandstone outcrops.

**Indigofera tenuis Milne-Redh. subsp. major Gillett**

**Status:** DD  
Endemism: Endemic  
May be sunk under *I. dissitiflora* Schrire.

**Rhynchosia totta (Thunb.) DC. var. elongatifolia Verdc.**

**Status:** DD  
Endemism: Endemic  
Distribution: Great Dyke  
Habitat: Grassland—Serpentine  
On grassy hill slopes.

**Sophora velutina Lindl. subsp. zimbabweensis J.B.Gillett & Brummitt**

**Status:** DD  
Endemism: Endemic  
Distribution: Limpopo Escarpment—Kyro  
Site: Northwest of Great Zimbabwe, Buffalo Laop (Kyle National Park), Papoteke Gorge (Kyle National Park), Masvingo  
Habitat: Dry woodland

**Tephrosia chimanimaniana Brummitt**

**Status:** DD  
Endemism: Endemic  
Distribution: Chimanimani  
Habitat: Grassland—Quartzite

**Tephrosia elongata E.Mey. var. lasiocaulous Brummitt**

**Status:** DD  
Endemism: Endemic  
Distribution: Central Watershed  
Site: Matopos, Nyanga

**Tephrosia festina Brummitt**

**Status:** DD  
Endemism: Endemic  
Distribution: Eastern Highlands

**Tephrosia lurida Sonder var. drummondii Brummitt**

*Tephrosia longipes* Meisn.  
**Status:** DD  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Chimanimani  
Habitat: Grassland—Quartzite

**Tephrosia rupicola Gillett subsp. dreweana Brummitt**

**Status:** DD  
Endemism: Endemic

**Tephrosia rupicola Gillett subsp. rupicola**

**Status:** DD  
Endemism: Endemic

## LOBELIACEAE

**Cyphia alba N.E.Br.**

**Status:** DD  
Endemism: Endemic  
Distribution: Chimanimani  
Site: Summit of Mount Peza  
Habitat: Grassland—Quartzite  
Occurs in upland grassland.

## LYCOPODIACEAE

**Lycopodium phlegmaria L.**

**Status:** DD  
Distribution: Nyanga  
Site: Aberfoyle Tea Estate (Upstream Sports Club-site record)  
Recently reported to occur only at one locality; one clump of trees in Zimbabwe.

## LYTHRACEAE

**Rotala wildii A.Fern.**

**Status:** DD  
Endemism: Endemic  
Distribution: Northeastern Lowveld  
Site: Mtoko  
Habitat: Moist forest  
Known only from granite hills. Sunk under *R. lucalensis* R.Fern. & Diniz.

## MALPIGHIACEAE

**Triaspis dumeticola Launert**

**Status:** DD  
Endemism: Endemic  
Distribution: Limpopo Escarpment—Matopos  
Site: Maleme Dam  
Habitat: Dry woodland  
On edges and openings of woodland. Known only from type specimen.

## MALVACEAE

**Pavonia rogersii N.E.Br.**

**Status:** DD  
Endemism: Endemic  
Distribution: Zambezi Lowveld  
Site: Gwai-Letopi Junction in Hwange, Binga  
Habitat: Dry woodland

## MELIACEAE

**Turraea fischeri Gürke subsp. eylesii (Bakerf.) Styles & White**

*Turraea eylesii* Baker f.  
**Status:** DD  
Endemism: Endemic  
Distribution: Central Watershed  
Site: Matapa Hills, Bulalimangwe, Khami ruins  
Habitat: Dry woodland  
Granite hills.

## ORCHIDACEAE

**Bonatea speciosa (L.f.) Willd.**

*Bonatea densiflora* Sond.  
**Status:** DD  
Distribution: Eastern Highlands, Central Watershed  
Site: Marondera, Chimanimani village  
Habitat: Moist forest  
Open deciduous woodland species. Common coastal scrub species, also on forest margins and in savanna. Was previously known as *B. speciosa* var. *speciosa*. Occurs in South Africa and elsewhere.

**Didymoplexis africana Summerh.**

**Status:** DD  
Distribution: Vumba  
Site: Vumba  
Habitat: Moist forest  
Widespread in Africa. One old collection in Zimbabwe. Lost collected in 1976. Just needs to be recollected, but is probably widespread. The identity of this specimen is doubtful.

**Eulophia angolensis (Rchb.f.) Summerh.**

**Status:** DD  
Threats: Desiccation, collection  
Distribution: Central Watershed  
Site: Harare, Mutoko, Tarka  
Habitat: Wetland  
Large plants, rare but very conspicuous with big yellow flowers (height of 1–1.5 m tall). Common throughout Africa. Is diminishing. Habitat is very wet parts of dambas, threatened habitat. Rarely seen.

**Eulophia coeloglossa Schltr.**

**Status:** DD  
Threats: Desiccation  
Distribution: Central Watershed  
Site: Mvurwi, Rusape  
Habitat: Dambo  
Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dambos which are threatened as a result of desiccation.

**Eulophia flavopurpurea Rolfe**

**Status:** DD  
Threats: Desiccation  
Distribution: Central Watershed  
Site: Mazoe  
Habitat: Dambo  
Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dambos, which are threatened as a result of desiccation.

**Eulophia horsfallii (Bateman) Summerh.**

**Status:** DD  
Threats: Desiccation  
Distribution: Central Watershed  
Site: Harare, Mutare, Masvingo



**Habitat:** Dambo  
 Large, conspicuous plants with big yellow/purple/brown/pink flowers, and up to 2 m tall. Found throughout the whole of Tropical Africa. Is diminishing. Seen in very wet, lentic parts of dombos around Harare, thrive in shade. Dombos are threatened habitats.

***Eulophia inyangensis* Summerh.**

*Eulophia monticola* Schltr.

**Status:** DD  
**Distribution:** Nyanga  
**Site:** Imyanyani, Mutane  
**Habitat:** Grassland

The species was sunk under *E. monticola*. Considered rare. Well-drained rocky slopes in montane zone at an altitude of 2,300 m. Endemic to the Nyongo Mountains. The taxonomy remains dubious.

***Eulophia kyimbilae* Schltr.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Harare

**Habitat:** Dambo  
 Widespread throughout Zimbabwe and Africa, but hardly ever seen. Has a scattered distribution. Known from seasonal dombos which are threatened as a result of desiccation.

***Eulophia milnei* Rchb.f.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Matopos, Marondera, Chimanimani  
**Habitat:** Dambo

Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dombos which are threatened as a result of desiccation. Small plant.

***Eulophia tanganyikensis* Rolfe**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Harare  
**Habitat:** Dambo

Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dombos which are threatened as a result of desiccation.

***Habenaria anaphysemia* Rchb.f.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed, Chimanimani  
**Site:** Marondera, Chimanimani  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria armatissima* Rchb.f.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Umvumvumu Gorge  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria calvilabris* Summerh.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Makonde, Harare  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria cornuta* Lindl.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Miami, Harare  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries

outside Zimbabwe. It is better protected here than in other parts of the country.

***Habenaria epipactidea* Rchb.f.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Marondera, Nyanga  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria galactantha* Kraenzl.**

**Status:** DD  
**Threats:** Desiccation, grazing  
**Distribution:** Central Watershed  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Habenaria holothrix* Schltr.**

**Status:** DD  
**Threats:** Desiccation, grazing  
**Distribution:** Central Watershed  
**Site:** Harare  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Habenaria holubii* Rolfe**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed (W)  
**Site:** Leshomo Valley  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe. Western Zimbabwe is the driest part of the highveld. Status currently unknown.

***Habenaria ichneumonea* (Sw.) Lindl.**

**Status:** DD  
**Threats:** Desiccation, grazing  
**Distribution:** Central Watershed  
**Site:** Harare, Masvingo  
**Habitat:** Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Habenaria rautaneniana* Kraenzl.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed (N)  
**Site:** Doma, Harare  
**Habitat:** Wetland-Dambo  
 In threatened dombos. Well-represented in countries outside Zimbabwe. Observed on state land.

***Habenaria stenorhynchos* Schltr.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Harare, Masvingo  
**Habitat:** Dambo-Grassland  
 In dombos subjected to desiccation. Well-represented in countries outside Zimbabwe.

***Habenaria tridens* Lindl.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed (E)  
**Site:** Haroni Gorge  
**Habitat:** Wetland-Dambo  
 Dombos, threatened habitat as a result of desiccation. Well-represented in countries outside Zimbabwe.

***Habenaria weberiana* Schltr.**

**Status:** DD  
**Threats:** Desiccation  
**Distribution:** Central Watershed  
**Site:** Harare

**Habitat:** Dambo  
 In dombos, threatened habitat as a result of desiccation. Well-represented in countries outside Zimbabwe.

***Habenaria zambesina* Rchb.f.**

**Status:** DD  
**Threats:** Desiccation, grazing  
**Distribution:** Central Watershed  
**Site:** Harare  
**Habitat:** Dambo  
 Seasonal wetlands such as dombos, threatened habitat as a result of desiccation. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Holothrix micrantha* Schltr.**

**Status:** DD  
**Threats:** Afforestation  
**Distribution:** Nyanga  
**Site:** Dannakay Hotel  
**Habitat:** Grassland  
 Only appears after fire, so it may be more common than records indicate. Also occurs in Gouteng (South Africa). Flowers from September to October. The taxonomic identity needs checking. Known from one locality in Zimbabwe; collected once in 1949. Area now under wattle.

## PASSIFLORACEAE

***Basananthe parvifolia* Afzel.**

*Tryphostemma parvifolium* Baker f.  
**Status:** DD  
**Endemism:** Endemic  
**Distribution:** Chimanimani  
**Site:** Musapa Mountains in Chimanimani, Fortune Farm in Chipinge, Tandai Falls in Chimanimani, Tarka Forest Reserve in Chimanimani  
**Habitat:** Grassland-quartzite  
 Grassland and open forest.

## POACEAE

***Aristida brainii* Melderis**

*Aristida serrulata* sensu Stent & Rattray  
**Status:** DD  
**Endemism:** Endemic  
**Distribution:** NW Zimbabwe, Zambezi Lowveld  
**Site:** Victoria Falls, Hwange, Kariba  
 Recorded only from Zimbabwe. Easily confused with *A. serrulata* recorded from Eritrea.

***Aristida hispidula* Henrard**

**Status:** DD  
**Endemism:** Endemic  
**Distribution:** Central Watershed  
**Site:** Darwendale, Nyamantlovu, Rundi River  
**Habitat:** Grassland  
 In chrome-rich grasslands and dombos.

***Craspedorhachis digitata* Kupicha & Cope**

**Status:** DD  
**Endemism:** Endemic  
**Distribution:** Limpopo Escarpment  
**Site:** Mhakwe Hill (Wedza), Mount Hozvi (Bikita)  
**Habitat:** Rocky  
 Granite outcrops often in block soils in fissures of exposed granite domes.

***Eragrostis glischna* Launert**

**Status:** DD  
**Endemism:** Endemic  
**Distribution:** NW Zimbabwe  
**Site:** Chizarira Game Reserve, Mandavu Dam near Sinamatella  
**Habitat:** Dry woodland  
 Hot dry areas. Often in mopane woodland, rocky places.

## POLYGALACEAE

*Polygala westii* Exell

Status: DD

Endemism: Endemic

Distribution: Limpopo Escarpment—Matopos

Site: Matopos

Known only from the type specimen.

## PORTULACACEAE

*Portulaca rhodesiana* R.A.Dyer & E.A.Bruce

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Matopos and Ngomakurira (Chinamhora)

Habitat: Rocky

A pioneer in the hollows of bore, granite outcrops, developing as an ephemeral in the course of the rain season.

## PROTEACEAE

*Faurea saligna* Harv. subsp. *xanthoneura* Merxm.

Status: DD

Endemism: Endemic

Dubious taxonomy.

*Protea asymmetrica* Beard

Status: DD

Endemism: Endemic

Distribution: Nyanga

Site: Mount Inyangani (western slope), Chingamwe

Plateau

Habitat: Grassland

Known from a single subpopulation. Coarse grassland.

*Protea inyanganiensis* Beard

Status: DD

Endemism: Endemic

Distribution: Nyanga

Site: Summit of Mount Inyangani

Habitat: Grassland

Found only in a small area on the summit of Mount Inyangani. Grows among rocks in peaty tussock grassland. Said to require rocks for fire protection. Sunk under *P. dracomontana* Beard, but has been kept separate in Zimbabwe.

## RUBIACEAE

*Pavetta* sp. near *lasiopeplus* fide Bridson

Status: DD

Distribution: Limpopo/Save Lowveld

Site: Between Chipinda Pools and Chiredzi

Habitat: Dry forest

Known from only two other disjunct localities in Molawi (Lengwe Game Reserve) and Chipingo. Very little herbarium material available. The subpopulations in

Molawi and Zimbabwe both exhibit similar differences to *P. zeyheri* and *P. lasiopeplus*. Found in dense evergreen forest.

*Rytigynia* sp. D of FZ

Status: DD

Endemism: Endemic

Distribution: Chimanimani

Site: Below Mount Peza

Habitat: Moist forest

Dense evergreen rainforest in a large valley. Very distinct-looking species.

*Sericanthe odoratissima* (K.Schum.) Robbrecht subsp. *B* Bridson ined.

Status: DD

Endemism: Endemic

Distribution: Eastern Highlands

Site: Stapleford Forest Reserve (Mutare District)

Habitat: Moist forest

Within or at edge of mixed evergreen forest. 1,400–1,830 m. Only known from the Mutare District.

*Sericanthe* sp. fide Bridson

Status: DD

Endemism: Endemic

Threats: Habitat degradation

Distribution: Limpopo Escarpment—Chipinga

Site: Chipinga District

Known from a number of old and recent collections, all from the same locality.

## SCROPHULARIACEAE

*Buchnera androsacea* Merxm.

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Enterprise, Marondera

Habitat: Grassland

Grasslands. Said to be similar to *B. hockii* De Wilde, but the basal leaves do not turn black on drying.

*Buchnera pusilliflora* S.Moore

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Miami, Domboshava, Besna Kobilu Farm, Mazoe

Habitat: Grassland

In open grasslands on well-drained soils. Can be confused with *B. randii* S.Moore.

*Manulea rhodesiana* S.Moore

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Macheke, Makoholi (Masvingo), Juliasdale

(Nyanga)

Habitat: Grassland

Wet grassland bordering rivers and streams, also a weed of roadsides and cultivation, 1,000–1,850 m.

*Selago goetzei* Rolfe subsp. *ambigua* Hilliard*Wolafrida goetzei* (Rolfe) Brenan var. *pubescentiar* Brenan

Status: DD

Endemism: Endemic

Distribution: Eastern Highlands

Site: Nyanga, Chimanimani (near Saverombe boundary)

Habitat: Grassland

Montane grasslands.

*Selago swynnertonii* (S.Moore) Hilliard var. *leiophylla* (Brenan) Hilliard

Status: DD

Endemism: Endemic

Distribution: Nyanga

Site: Juliasdale, Nyanga National Park

Habitat: Grassland

Known mainly from roadsides and firebreaks. Known only from Mount Inyangoni.

*Selago thyrsoidea* Baker var. *austrorhodesica* Brenan

Status: DD

Endemism: Endemic

Distribution: Eastern Highlands

Site: Nyanga

Altitude of 2,400 m.

*Stemodiopsis eylesii* S.Moore

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Iron Mask Hill, Mazoe

Habitat: Moist woodland

Cliff crevices. Known only from the type specimen.

*Torenia monroi* (S.Moore) Philcox*Craterastigma monroi* S.Moore

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Nyamahere Hill, Mutoko, Mount Jim in Bulalima

Mangwe, Gwenoro Dam, Gweru and Save Drift, Mutare

Habitat: Wetland

Known from ephemeral rock pools. 800–1,400 m.

## VITACEAE

*Cyphostemma graniticum* (Wild & R.B.Drumm.) Wild & R.B.Drumm.

Status: DD

Endemism: Endemic

Distribution: Central Watershed, Great Dyke (N)

Site: Nyamunyeche Estate (Guruvu), Vanad Pass,

Mutorashanga Pass, Rod Camp Mine, Ruorka Ranch,

Horse Shoe Mine, Kandeya Nature Reserve

(Mavuradonha Hill slopes), Ngomakurira, Domboshava

Hill, Munanga Farm (Makoni)

Habitat: Moist forest, grassland

Favours granite rocks in grasslands. Also grows on chrome hills on the Great Dyke.



Fynbos-like vegetation in Nyanga. (Photo: J. Timberlake)



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# APPENDIX 1

## 1994 IUCN Red List Categories

Prepared by the  
IUCN Species Survival Commission  
As approved by the  
40th Meeting of the IUCN Council  
Gland, Switzerland  
30 November 1994

### I) Introduction

1. The threatened species categories now used in Red Data Books and Red Lists have been in place, with some modification, for almost 30 years. Since their introduction these categories have become widely recognised internationally, and they are now used in a whole range of publications and listings, produced by IUCN as well as by numerous governmental and non-governmental organisations. The Red Data Book categories provide an easily and widely understood method for highlighting those species under higher extinction risk, so as to focus attention on conservation measures designed to protect them.

2. The need to revise the categories has been recognised for some time. In 1984, the SSC held a symposium, 'The Road to Extinction' (Fitter & Fitter 1987), which examined the issues in some detail, and at which a number of options were considered for the revised system. However, no single proposal resulted. The current phase of development began in 1989 with a request from the SSC Steering Committee to develop a new approach that would provide the conservation community with useful information for action planning.

In this document, proposals for new definitions for Red List categories are presented. The general aim of the new system is to provide an explicit, objective framework for the classification of species according to their extinction risk.

The revision has several specific aims:

- To provide a system that can be applied consistently by different people;
- To improve the objectivity by providing those using the criteria with clear guidance on how to evaluate different factors which affect risk of extinction;
- To provide a system which will facilitate comparisons across widely different taxa;

- To give people using threatened species lists a better understanding of how individual species were classified.

3. The proposals presented in this document result from a continuing process of drafting, consultation and validation. It was clear that the production of a large number of draft proposals led to some confusion, especially as each draft has been used for classifying some set of species for conservation purposes. To clarify matters, and to open the way for modifications as and when they became necessary, a system for version numbering was applied as follows:

- Version 1.0: Mace & Lande (1991)

The first paper discussing a new basis for the categories, and presenting numerical criteria especially relevant for large vertebrates.

- Version 2.0: Mace *et al.* (1992)

A major revision of Version 1.0, including numerical criteria appropriate to all organisms and introducing the non-threatened categories.

- Version 2.1: IUCN (1993)

Following an extensive consultation process within SSC, a number of changes were made to the details of the criteria, and fuller explanation of basic principles was included. A more explicit structure clarified the significance of the non-threatened categories.

- Version 2.2: Mace & Stuart (1994)

Following further comments received and additional validation exercises, some minor changes to the criteria were made. In addition, the Susceptible category present in Versions 2.0 and 2.1 was subsumed into the Vulnerable category. A precautionary application of the system was emphasised.

- Final Version

This final document, which incorporates changes as a result of comments from IUCN members, was adopted by the IUCN Council in December 1994.

All future taxon lists including categorisa-

tions should be based on this version, and not the previous ones.

4. In the rest of this document the proposed system is outlined in several sections. The Preamble presents some basic information about the context and structure of the proposal, and the procedures that are to be followed in applying the definitions to species. This is followed by a section giving definitions of terms used. Finally the definitions are presented, followed by the quantitative criteria used for classification within the threatened categories. It is important for the effective functioning of the new system that all sections are read and understood, and the guidelines followed.

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### II) Preamble

The following points present important information on the use and interpretation of the categories (= Critically Endangered, Endangered, etc.), criteria (= A to E), and sub-criteria (= a,b etc., i,ii etc.):

#### 1. Taxonomic Level and Scope of the Categorisation Process

The criteria can be applied to any taxonomic unit at or below the species level. The term 'taxon' in the following notes, definitions and criteria is used for conven-

ience, and may represent species or lower taxonomic levels, including forms that are not yet formally described. There is a sufficient range among the different criteria to enable the appropriate listing of taxa from the complete taxonomic spectrum, with the exception of micro-organisms. The criteria may also be applied within any specified geographical or political area although in such cases special notice should be taken of point 11 below. In presenting the results of applying the criteria, the taxonomic unit and area under consideration should be made explicit. The categorisation process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (defined in the draft IUCN Guidelines for Re-introductions as “..an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area”).

## 2. Nature of the Categories

All taxa listed as Critically Endangered qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. Together these categories are described as ‘threatened’. The threatened species categories form a part of the overall scheme. It will be possible to place all taxa into one of the categories (see Figure 1).

## 3. Role of the Different Criteria

For listing as Critically Endangered, Endan-

gered or Vulnerable there is a range of quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. Each species should be evaluated against all the criteria. The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and the diverse life histories they exhibit. Even though some criteria will be inappropriate for certain taxa (some taxa will never qualify under these however close to extinction they come), there should be criteria appropriate for assessing threat levels for any taxon (other than micro-organisms). The relevant factor is whether any one criterion is met, not whether all are appropriate or all are met. Because it will never be clear which criteria are appropriate for a particular species in advance, each species should be evaluated against all the criteria, and any criterion met should be listed.

## 4. Derivation of Quantitative Criteria

The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values exists. The levels for different criteria within categories were set independently but against a common standard. Some broad consistency between them was sought. However, a given taxon should not be expected to meet all criteria (A-E) in a category; meeting any one criterion is suf-

ficient for listing.

## 5. Implications of Listing

Listing in the categories of Not Evaluated and Data Deficient indicates that no assessment of extinction risk has been made, though for different reasons. Until such time as an assessment is made, species listed in these categories should not be treated as if they were non-threatened, and it may be appropriate (especially for Data Deficient forms) to give them the same degree of protection as threatened taxa, at least until their status can be evaluated.

Extinction is assumed here to be a chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the time-frames specified more taxa listed in a higher category are expected to go extinct than in a lower one (without effective conservation action). However, the persistence of some taxa in high risk categories does not necessarily mean their initial assessment was inaccurate.

## 6. Data Quality and the Importance of Inference and Projection

The criteria are clearly quantitative in nature. However, the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasised to be acceptable throughout. Inference and projection may be based on extrapo-

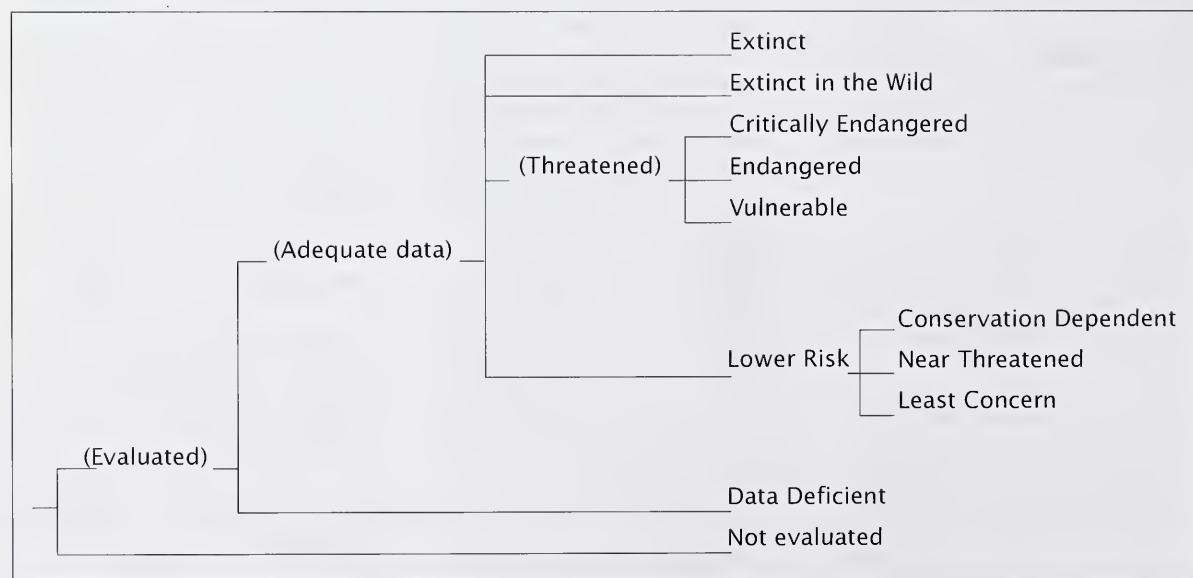


Figure 1: Structure of Categories.



lation of current or potential threats into the future (including their rate of change), or of factors related to population abundance or distribution (including dependence on other taxa), so long as these can reasonably be supported. Suspected or inferred patterns in either the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified.

Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distributions, few locations). Some threats need to be identified particularly early, and appropriate actions taken, because their effects are irreversible, or nearly so (pathogens, invasive organisms, hybridization).

### 7. Uncertainty

The criteria should be applied on the basis of the available evidence on taxon numbers, trend and distribution, making due allowance for statistical and other uncertainties. Given that data are rarely available for the whole range or population of a taxon, it may often be appropriate to use the information that is available to make intelligent inferences about the overall status of the taxon in question. In cases where a wide variation in estimates is found, it is legitimate to apply the precautionary principle and use the estimate (providing it is credible) that leads to listing in the category of highest risk.

Where data are insufficient to assign a category (including Lower Risk), the category of 'Data Deficient' may be assigned. However, it is important to recognise that this category indicates that data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known. In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, it is important to attempt threatened listing, even though there may be little direct information on the biological status of the taxon itself. The category 'Data Deficient' is not a threatened category, although it indicates a need to obtain more information on a taxon to determine the appropriate listing.

### 8. Conservation Actions in the Listing Process

The criteria for the threatened categories are to be applied to a taxon whatever the

level of conservation action affecting it. In cases where it is only conservation action that prevents the taxon from meeting the threatened criteria, the designation of 'Conservation Dependent' is appropriate. It is important to emphasise here that a taxon require conservation action even if it is not listed as threatened.

### 9. Documentation

All taxon lists including categorisation resulting from these criteria should state the criteria and sub-criteria that were met. No listing can be accepted as valid unless at least one criterion is given. If more than one criterion or sub-criterion was met, then each should be listed. However, failure to mention a criterion should not necessarily imply that it was not met. Therefore, if a re-evaluation indicates that the documented criterion is no longer met, this should not result in automatic down-listing. Instead, the taxon should be re-evaluated with respect to all criteria to indicate its status. The factors responsible for triggering the criteria, especially where inference and projection are used, should at least be logged by the evaluator, even if they cannot be included in published lists.

### 10. Threats and Priorities

The category of threat is not necessarily sufficient to determine priorities for conservation action. The category of threat simply provides an assessment of the likelihood of extinction under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation action such as costs, logistics, chances of success, and even perhaps the taxonomic distinctiveness of the subject.

### 11. Use at Regional Level

The criteria are most appropriately applied to whole taxa at a global scale, rather than to those units defined by regional or national boundaries. Regionally or nationally based threat categories, which are aimed at including taxa that are threatened at regional or national levels (but not necessarily throughout their global ranges), are best used with two key pieces of information: the global status category for the taxon, and the proportion of the global population or range that occurs within the region or nation. However, if applied at regional or national level it must be recognised that a global category of threat may not be the same as a regional or national category for a par-

ticular taxon. For example, taxa classified as Vulnerable on the basis of their global declines in numbers or range might be Lower Risk within a particular region where their populations are stable. Conversely, taxa classified as Lower Risk globally might be Critically Endangered within a particular region where numbers are very small or declining, perhaps only because they are at the margins of their global range. IUCN is still in the process of developing guidelines for the use of national red list categories.

### 12. Re-evaluation

Evaluation of taxa against the criteria should be carried out at appropriate intervals. This is especially important for taxa listed under Near Threatened, or Conservation Dependent, and for threatened species whose status is known or suspected to be deteriorating.

### 13. Transfer Between Categories

There are rules to govern the movement of taxa between categories. These are as follows: (A) A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has been met for five years or more. (B) If the original classification is found to have been erroneous, the taxon may be transferred to the appropriate category or removed from the threatened categories altogether, without delay (but see Section 9). (C) Transfer from categories of lower to higher risk should be made without delay.

### 14. Problems of Scale

Classification based on the sizes of geographic ranges or the patterns of habitat occupancy is complicated by problems of spatial scale. The finer the scale at which the distributions or habitats of taxa are mapped, the smaller the area will be that they are found to occupy. Mapping at finer scales reveals more areas in which the taxon is unrecorded. It is impossible to provide any strict but general rules for mapping taxa or habitats; the most appropriate scale will depend on the taxa in question, and the origin and comprehensiveness of the distributional data. However, the thresholds for some criteria (e.g. Critically Endangered) necessitate mapping at a fine scale.

### III) Definitions

#### 1. Population

Population is defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life-forms, population numbers are expressed as numbers of mature individuals only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

#### 2. Subpopulations

Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

#### 3. Mature Individuals

The number of mature individuals is defined as the number of individuals known, estimated or inferred to be capable of reproduction. When estimating this quantity the following points should be borne in mind:

- Where the population is characterised by natural fluctuations the minimum number should be used.
- This measure is intended to count individuals capable of reproduction and should therefore exclude individuals that are environmentally, behaviourally or otherwise reproductively suppressed in the wild.
- In the case of populations with biased adult or breeding sex ratios it is appropriate to use lower estimates for the number of mature individuals which take this into account (e.g. the estimated effective population size).
- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals).
- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.

#### 4. Generation

Generation may be measured as the average age of parents in the population. This is greater than the age at first breeding, except in taxa where individuals breed only once.

#### 5. Continuing Decline

A continuing decline is a recent, current or projected future decline whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Natural fluctuations will not normally count as a continuing decline, but an observed decline should not be considered to be part of a natural fluctuation unless there is evidence for this.

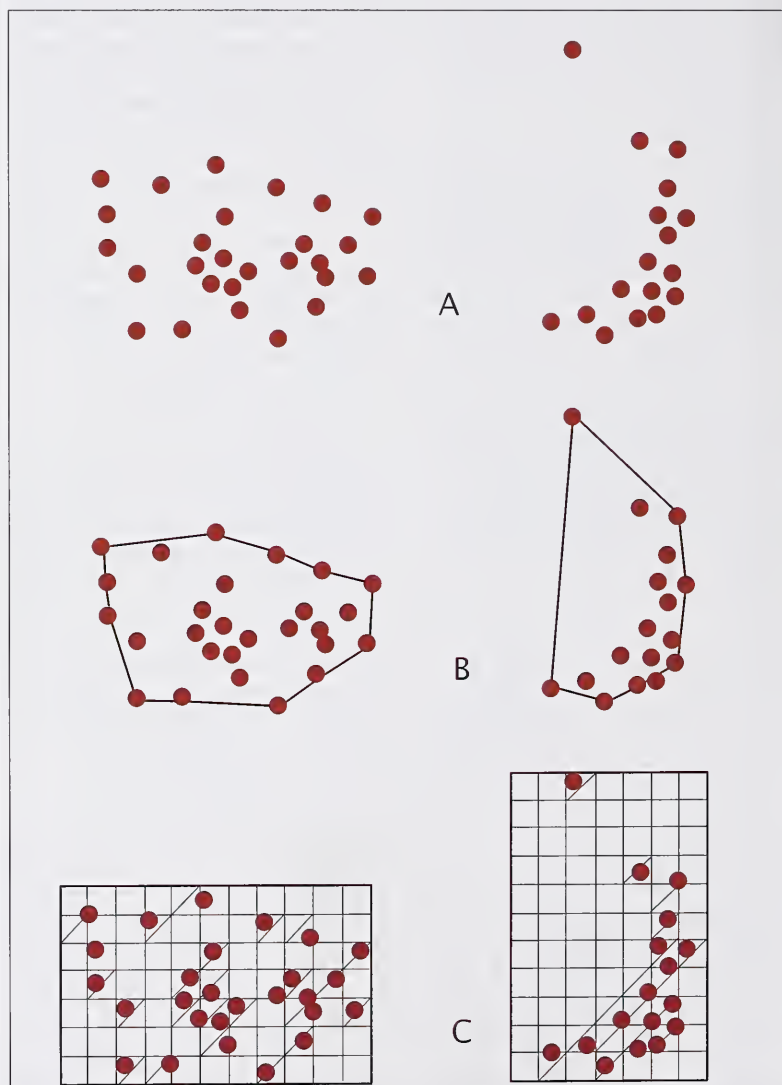
#### 6. Reduction

A reduction (criterion A) is a decline in the number of mature individuals of at least

the amount (%) stated over the time period (years) specified, although the decline need not still be continuing. A reduction should not be interpreted as part of a natural fluctuation unless there is good evidence for this. Downward trends that are part of natural fluctuations will not normally count as a reduction.

#### 7. Extreme Fluctuations

Extreme fluctuations occur in a number of taxa where population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e., a tenfold increase



**Figure 2: Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be measured by the sum of the occupied grid squares.**



or decrease).

### 8. Severely Fragmented

Severely fragmented refers to the situation where increased extinction risks to the taxon result from the fact that most individuals within a taxon are found in small and relatively isolated subpopulations. These small subpopulations may go extinct, with a reduced probability of recolonisation.

### 9. Extent of Occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g., large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

### 10. Area of Occupancy

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon. The criteria include values in km<sup>2</sup>, and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small (see Figure 2).

### 11. Location

Location defines a geographically or ecologically distinct area in which a single event (e.g. pollution) will soon affect all individuals of the taxon present. A location usually,

but not always, contains all or part of a subpopulation of the taxon, and is typically a small proportion of the taxon's total distribution.

### 12. Quantitative Analysis

A quantitative analysis is defined here as the technique of population viability analysis (PVA), or any other quantitative form of analysis, which estimates the extinction probability of a taxon or population based on the known life history and specified management or non-management options. In presenting the results of quantitative analyses the structural equations and the data should be explicit.

## IV) The Categories<sup>1</sup>

### EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

### EXTINCT IN THE WILD (EW)

A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

### CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E) on pages 13 and 14.

### ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E) on pages 14 and 15.

### VULNERABLE (VU)

A taxon is Vulnerable when it is not Criti-

cally Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to E) on pages 15 and 16.

### LOWER RISK (LR)

A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
2. Near Threatened (nt). Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
3. Least Concern (lc). Taxa which do not qualify for Conservation Dependent or Near Threatened.

### DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

### NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been assessed against the criteria.

<sup>1</sup> Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages.

## V) The Criteria for Critically Endangered, Endangered and Vulnerable

### CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

- a) direct observation
- b) an index of abundance appropriate for the taxon
- c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- d) actual or potential levels of exploitation
- e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A reduction of at least 80%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

B) Extent of occurrence estimated to be less than 100 km<sup>2</sup> or area of occupancy estimated to be less than 10 km<sup>2</sup>, and estimates indicating any two of the following:

1) Severely fragmented or known to exist at only a single location.

2) Continuing decline, observed, inferred or projected, in any of the following:

- a) extent of occurrence
- b) area of occupancy
- c) area, extent and/or quality of habitat
- d) number of locations or subpopulations
- e) number of mature individuals.

3) Extreme fluctuations in any of the following:

- a) extent of occurrence
- b) area of occupancy
- c) number of locations or subpopulations
- d) number of mature individuals.

C) Population estimated to number less than 250 mature individuals and either:

1) An estimated continuing decline

of at least 25% within three years or one generation, whichever is longer or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a) severely fragmented (i.e. no subpopulation estimated to contain more than 50 mature individuals)

b) all individuals are in a single subpopulation.

D) Population estimated to number less than 50 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer.

### ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

- a) direct observation
- b) an index of abundance appropriate for the taxon
- c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- d) actual or potential levels of exploitation
- e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A reduction of at least 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.

B) Extent of occurrence estimated to be less than 5,000 km<sup>2</sup> or area of occupancy estimated to be less than 500 km<sup>2</sup>, and estimates indicating any two of the following:

1) Severely fragmented or known to exist at no more than five locations.

2) Continuing decline, inferred, observed or projected, in any of the following:

- a) extent of occurrence

b) area of occupancy

c) area, extent and/or quality of habitat

d) number of locations or subpopulations

e) number of mature individuals.

3) Extreme fluctuations in any of the following:

- a) extent of occurrence
- b) area of occupancy
- c) number of locations or subpopulations
- d) number of mature individuals.

C) Population estimated to number less than 2,500 mature individuals and either:

1) An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a) severely fragmented (i.e. no subpopulation estimated to contain more than 250 mature individuals)

b) all individuals are in a single subpopulation.

D) Population estimated to number less than 250 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer.

### VULNERABLE (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

- a) direct observation
- b) an index of abundance appropriate for the taxon
- c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- d) actual or potential levels of exploitation
- e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.



- 2) A reduction of at least 20%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.
- B) Extent of occurrence estimated to be less than 20,000 km<sup>2</sup> or area of occupancy estimated to be less than 2,000 km<sup>2</sup>, and estimates indicating any two of the following:
- Severely fragmented or known to exist at no more than ten locations.
  - Continuing decline, inferred, observed or projected, in any of the following:
    - extent of occurrence
    - area of occupancy
    - area, extent and/or quality of habitat
    - number of locations or subpopulations
    - number of mature individuals

- 3) Extreme fluctuations in any of the following:
- extent of occurrence
  - area of occupancy
  - number of locations or subpopulations
  - number of mature individuals
- C) Population estimated to number less than 10,000 mature individuals and either:
- An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, or
  - A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
    - severely fragmented (i.e. no subpopulation estimated to contain more than 1,000 mature individuals)

- b) all individuals are in a single subpopulation
- D) Population very small or restricted in the form of either of the following:
- Population estimated to number less than 1,000 mature individuals.
  - Population is characterised by an acute restriction in its area of occupancy (typically less than 100 km<sup>2</sup>) or in the number of locations (typically less than five). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period.
- E) Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

## APPENDIX 2

### 1994 Categorias da Lista Vermelha da IUCN

DOCUMENTO ELABORADO PELA  
Species Survival Commission - SSC DA IUCN  
APROVADO NA 40ª REUNIÃO DO CONSELHO DA IUCN  
GLAND, SUÍÇA  
30 de novembro de 1994

#### I. INTRODUÇÃO

1. As categorias de espécies ameaçadas atualmente em uso no Livros Vermelhos e nas Listas Vermelhas têm sido mantidas, com algumas modificações, por quase trinta anos. Desde o início, estas categorias tem se tornado amplamente reconhecidas e usadas em todas as publicações e listas produzidas pela IUCN, bem como por numerosas organizações governamentais e não governamentais. As categorias do Livro Vermelho fornecem um método fácil e de grande compreensão para destacar as espécies que se encontram em alto risco de extinção, uma vez que concentram a atenção para as medidas de conservação traçadas para a proteção das espécies.

2. A necessidade de revisão das categorias tem sido reconhecida há algum tempo. Em 1984, Species Survival Commission - SSC realizou um simpósio, "O caminho da Extinção" (Fitter & Fitter 1987), no qual a

questão foi examinada em detalhe e consideradas várias opções para a revisão do sistema. No entanto, não se obteve uma única proposta. A fase atual do desenvolvimento teve início em 1989 (ou 1987?) com uma solicitação do Steering Committee da SSC para desenvolver uma nova abordagem que poderá proporcionar à comunidade conservacionista informações úteis para os planos de ação.

Neste documento são apresentadas propostas para novas definições das categorias do Livro Vermelho. O objetivo geral do novo sistema é prover um modo explícito e objetivo para a classificação das espécies de acordo com seu risco de extinção.

A revisão apresenta vários objetivos específicos:

- Fornecer um sistema que possa ser aplicado de modo consistente por diferentes pessoas;
- Tornar mais objetivos os critérios usa-

dos, mediante a orientação clara sobre o modo de avaliar diferentes fatores que afetam o risco de extinção;

- Fornecer um sistema que facilite comparações em taxa completamente diferentes;
- Proporcionar ao público que utiliza listas de espécies ameaçadas de extinção um melhor entendimento de como são classificadas as diferentes espécies.

3. As propostas apresentadas neste documento são o resultado de um contínuo processo de tentativas, consulta e validação de propostas. Estava claro que a produção de um grande número de propostas preliminares levaram a alguma confusão, especialmente porque cada tentativa estava sendo usada para classificar alguns grupos de espécies com a finalidade de conservação. Para esclarecer o assunto e permitir futuras modificações, quando e onde se tornarem necessárias, foi aplicado um sistema de numeração das versões da seguinte maneira:

- Versão 1.0: Mace & Lande (1991)  
O primeiro documento que discute uma nova base para as categorias e apresenta critérios numéricos especialmente relevante para os grandes vertebrados.
- Versão 2.0: Mace et al. (1992)  
Uma revisão mais aprofundada da Versão 1.0, incluindo critérios numéricos apropriados a todos os organismos, além de incluir as categorias Não Ameaçadas.
- Versão 2.1: IUCN (1993)  
Seguindo um extenso processo de consultas ao SSC, foram feitos uma série de modificações para detalhar os critérios e a inclusão de uma explanação completa dos princípios básicos. Uma estrutura mais explícita esclareceu o significado de categorias Não Ameaçadas.
- Versão 2.2: Mace & Stuart (1994)  
Considerando os comentários adicionais recebidos e os exercícios de validação, foram feitas pequenas modificações nos critérios. Além disso, a categoria Suscetível apresentada na Versão 2.0 e 2.1 foi incluída na categoria Vulnerável. Foi enfatizado que o sistema deve ser aplicado com precaução.
- Versão Final  
O documento final, o qual incorpora mudanças resultantes dos comentários dos membros da IUCN, foi adotado pelo Conselho da IUCN em dezembro de 1994.

Todas as futuras listas de taxa que incluam a disposição em categorias devem ser baseadas nesta versão, e não nas anteriores.

4. No restante deste documento, o sistema proposto é dividido em várias seções. O Preâmbulo apresenta informações básicas sobre o contexto e a estrutura da proposta, bem como os procedimentos a serem seguidos na aplicação das definições às espécies. Ao preâmbulo, seguem-se as definições dos termos usados. Finalmente, são apresentadas as definições, seguidas dos critérios quantitativos usados na classificação dentro das categorias ameaçadas. Para a efetiva funcionalidade do novo sistema, é importante que todas as seções sejam lidas e compreendidas e seguidas as orientações.

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## II. PREÂMBULO

Os tópicos abaixo apresentam importantes informações para o uso e interpretação das categorias (=Em Perigo Crítico, Em Perigo, etc), critérios (=A a E), e subcritérios (=a, b etc., i, ii etc.):

### 1. Nível Taxonômico e Escopo do Processo de Categorização

Os critérios podem ser aplicados a qualquer unidade taxonômica em nível de espécie ou abaixo desta. Por questão de conveniência, o termo "táxon" é usado, nas notas, definições e critérios seguintes, e pode representar espécies ou níveis taxonômicos inferiores, incluindo formas que não estão ainda formalmente descritas. Há suficiente amplitude entre os diferentes critérios de modo a permitir uma listagem completa de taxa de todo o espectro taxonômico, com exceção dos microorganismos. Os critérios podem também ser aplicados dentro de qualquer área geográfica ou política específica, embora em tais casos deva ser dada atenção especial ao item 11 abaixo. Na apresentação dos resultados da aplicação dos critérios, devem ser explicitadas a unidade taxonômica e a área considerada. O processo de categorização só deve ser aplicado a populações silvestres no âmbito da sua distribuição natural e às populações que resultaram de introduções benígnas (definidas na mi-

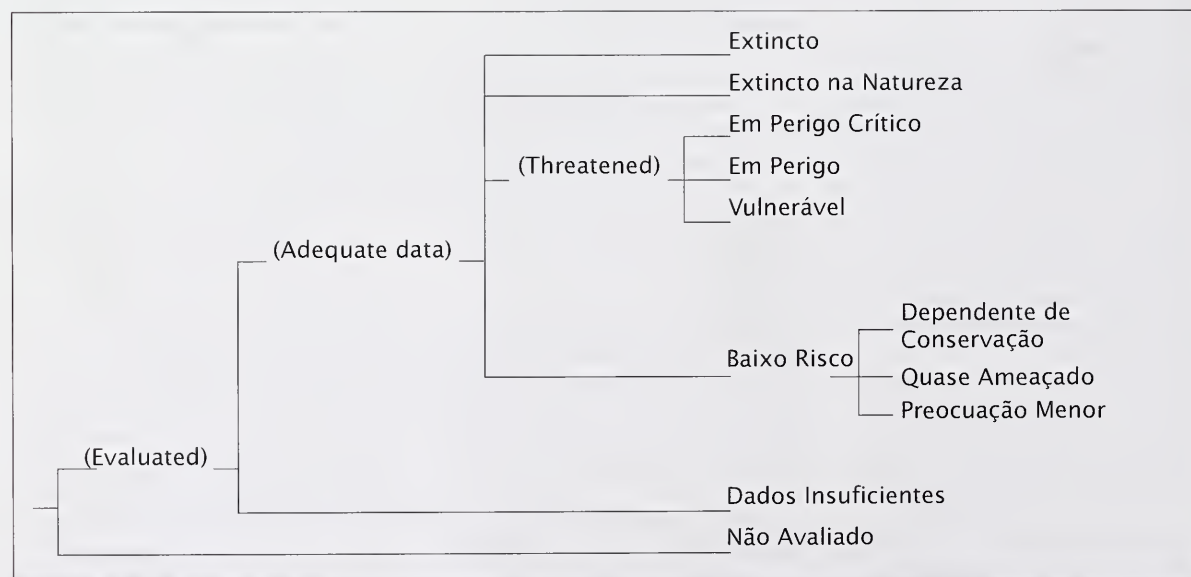


Figura 1: Structuro des categorias.



nuta “Diretrizes para Reintroduções como ...uma tentativa de fixar uma espécie, com propósitos conservacionistas, fora dos locais de distribuição registrados, porém dentro de um habitat e área ecogeográfica apropriada”).

## 2. Natureza das Categorias

Todos os taxa listados como Em Perigo Crítico também podem ser classificados como Vulnerável ou Em Perigo, e todos os taxa registrados como Em Perigo também podem ser qualificados como Vulnerável. Juntas, estas categorias são descritas como Ameaçadas. As categorias de espécies ameaçadas formam uma parte do esquema global. É possível classificar todos os taxa em pelo menos uma das categorias (ver Figura 1).

## 3. Papel dos Diferentes Critérios

Para que se possa listar um táxon com Em Perigo Crítico, Em Perigo ou Vulnerável existe uma série de critérios quantitativos; o atendimento de qualquer desses critérios qualifica um táxon para ser listado no nível ameaçado. Cada espécie deve ser avaliada tendo em conta todos os critérios. Os diferentes critérios (A - E) são derivados de uma ampla revisão, com a qual se pretendia detectar os fatores de risco comuns a uma ampla variedade de organismos e à diversidade de formas de vida que eles apresentam. Ainda assim, alguns critérios se mostrarão inapropriados para certos taxa (alguns taxa nunca serão enquadrados nesses critérios, por mais que se encontrem próximos da extinção), deveriam existir critérios apropriados para avaliar os níveis de ameaça para qualquer táxon (exceto os microorganismos). O fator relevante quando se inclui uma espécie em uma lista é se um critério qualquer é atendido, e não se todos são apropriados ou todos são atendidos. Dado que nunca ficará claro de antemão qual será o critério apropriado a uma espécie em particular, cada espécie deverá ser avaliada seguindo todos os critérios, e todo(s) aquele(s) que se se ajustem à espécie deverão ser mencionados.

## 4. Derivação dos Critérios Quantitativos

Os valores quantitativos apresentados para os vários critérios associados com as categorias ameaçadas foram desenvolvidos por meio de ampla consulta e têm sido estabelecidos em níveis julgados apropriados, mesmo quando não existe justificativa formal para esses valores. Os

níveis para os diferentes critérios, dentro de cada uma das categorias, foram estabelecidos independentemente, porém tendo em conta um padrão comum. Buscou-se a compatibilidade entre esses níveis, embora não seja esperado que um dado táxon deva ser enquadrado em todos os critérios (A - E) de uma categoria; o atendimento de um critério é suficiente para que a espécie seja classificada.

## 5. Implicações da Lista

Mesmo que por razões diferentes, o fato de se incluir espécies nas categorias Não Avaliado ou Dados Insuficientes indica que a avaliação sobre o risco de extinção não foi concluída. Até o momento em que a avaliação é concluída, as espécies incluídas nessas categorias não devem ser tratadas como sendo não ameaçadas, e seria apropriado (especialmente para as que figuram em Dados Insuficientes) o mesmo grau de proteção que é dado aos taxa ameaçados, pelo menos até que seu “status” possa ser elevado.

A extinção é aqui considerada como um processo probabilístico. Assim, incluir uma espécie numa categoria de alto risco de extinção implica numa maior expectativa de que a extinção ocorra e, no período de tempo especificado, se espera que mais taxa listados numa categoria mais alta sejam extintos do que os que estão em níveis inferiores (sem ações efetivas de conservação). No entanto, a permanência de alguns taxa em categorias de alto risco não significa necessariamente que sua avaliação inicial tenha sido incorreta.

## 6. Qualidade da Informação e Importância da Inferência e da Projeção

Os critérios são claramente de natureza quantitativa. No entanto, a ausência de informação de alta qualidade não devem ser motivo para se evitar a aplicação dos critérios, uma vez que os métodos envolvendo estimativas, inferências e projeções são aceitáveis ao longo de todo o processo. A inferência e a projeção podem ser baseadas na extrapolação futura das ameaças atuais ou potenciais (incluindo sua taxa de variação), ou em fatores relacionados com a abundância ou distribuição da população (incluindo sua dependência com outros taxa), na medida em que estes fatores possam ser razoavelmente justificados. Padrões supostos ou inferidos de passado recente, do presente ou do futuro próximo podem estar baseados em qualquer de uma

série de fatores relacionados e que deveriam am ser especificados.

Taxa em situação de perigo por ameaças de eventos futuros de baixa probabilidade mas de graves consequências (catástrofes) deveriam ser identificados pelos critérios (por ex. pequena distribuição, poucas localidades). Algumas ameaças necessitam ser identificadas precocemente, e adotadas as medidas apropriadas, pois os efeitos são irreversíveis, ou quase irreversíveis (patogênicos, organismos invasores, hibridação).

## 7. Incertezas

Os critérios devem ser aplicados com base em evidências disponíveis acerca do número, tendência e distribuição dos taxa considerando os erros estatísticos e de outros tipos. Uma vez que raramente se dispõe de informações para toda área de distribuição ou para toda população de um táxon, pode ser apropriada a utilização da informação disponível e a realização de inferências inteligentes sobre o status geral do táxon em questão. Nos casos em que se verifica uma ampla variação nas estimativas, é legítimo aplicar-se o princípio da prevenção e utilizar a estimativa (sempre que seja razoável) que conduza a uma inclusão na categoria de maior risco.

Quando os dados são insuficientes para que uma categoria (incluindo a de Menor Risco) seja adotada, a categoria Dados Insuficientes pode ser escolhida. Sem dúvida é importante reconhecer que esta categoria indica que os dados são inadequados para determinar o grau de ameaça a que está submetido um táxon, não implicando necessariamente que o táxon esteja pobremente estudado. No caso em que existem ameaças evidentes a um táxon, por exemplo, pela deterioração de seu único habitat conhecido, é importante tentar classificá-lo como ameaçado, mesmo que haja pouca informação direta sobre a condição biológica do táxon em si mesmo. A categoria Dados Insuficientes não é uma categoria de ameaça, ainda que indique a necessidade de obtenção de mais informação sobre um táxon para determinar uma classificação mais apropriada.

## 8. Ações de Conservação no Processo de Classificação

Os critérios para as categorias de ameaça existem para serem aplicados a um táxon, qualquer que seja o grau de ação que se esteja realizando. Nos casos em que as ações

de conservação em si mesmas são as que impedem que o táxon satisfaça os critérios de ameaçado, a designação de “Conservação Dependente” é apropriada. É importante destacar o caso em que o táxon requer ação de conservação, mesmo quando não está classificado como ameaçado.

## 9. Documentação

Todos as listas de taxa que incluem categorização resultante desses critérios deveriam incluir quais são os critérios e subcritérios que foram preenchidos. Nenhuma inclusão em lista pode ser aceita como válida a não ser quando pelo menos um critério tenha sido preenchido. Se mais de um critério ou subcritério foi atendido, então cada um deles deve ser listado. Sem dúvida, o fato de um critério não ser mencionado não significa que ele não tenha sido atendido. Por isso, se uma reavaliação indica que o critério documentado não está sendo atendido, isto não deve resultar em sua automática eliminação. Ao contrário, o táxon deve ser reavaliado com respeito a todos os critérios de modo a indicar o seu status. Os fatores responsáveis pela determinação dos critérios, especialmente quando se utiliza a inferência e a projeção, devem ser pelo menos registrados pelo avaliador, mesmo quando não puderem ser incluídos nas listas publicadas.

## 10. Ameaças e Prioridades

A categoria de ameaça não é necessariamente suficiente para determinar prioridades para as ações de conservação. A categoria de ameaça simplesmente fornece uma avaliação da probabilidade de extinção nas circunstâncias atuais, considerando que um sistema para avaliação das prioridades incluirá numerosos fatores relacionados às ações de conservação, tais como custos, logísticas, possibilidades de êxito e talvez até mesmo a unidade sistemática do táxon.

## 11. Uso em Nível Regional

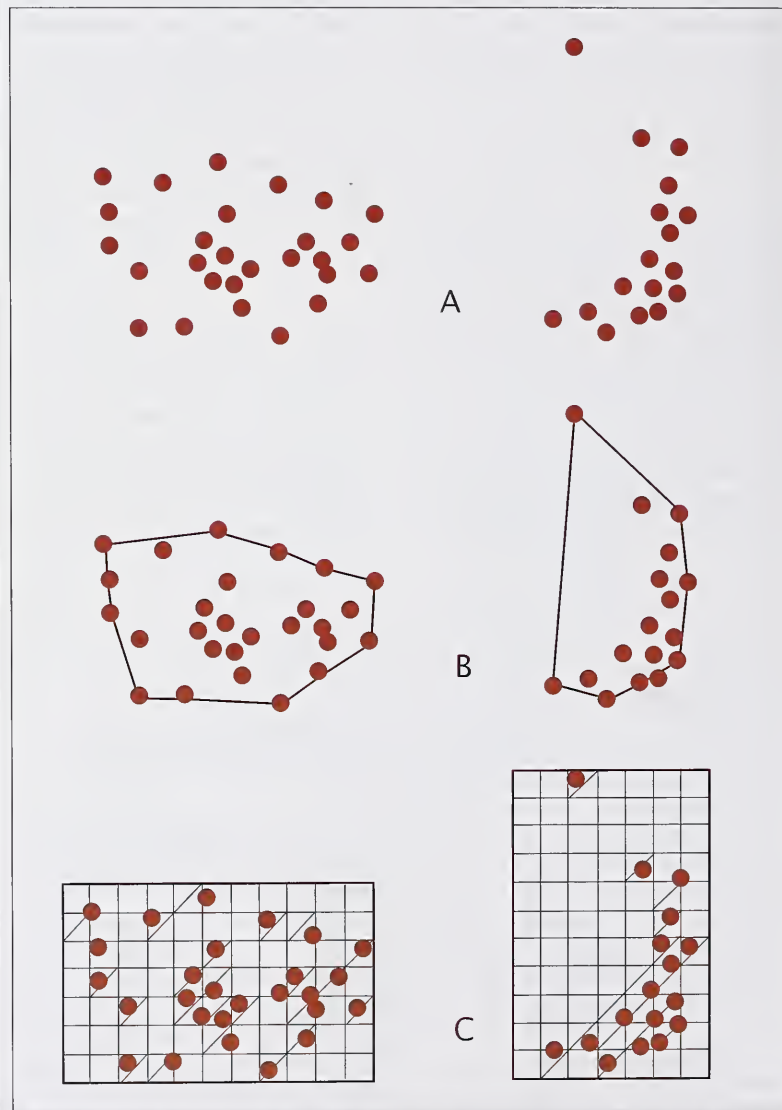
Os critérios são mais apropriadamente aplicados a taxa completos em escala global, do que aplicados a unidades definidas por limites regionais ou nacionais. Categorias de ameaça baseadas em informação em escala regional ou nacional, as quais têm como objeto a inclusão daqueles taxa que estão ameaçados em nível regional ou nacional (porém, não necessariamente toda sua distribuição mundial), são melhor utilizadas com dois elementos chaves de informação: a categoria do status global do

táxon e a proporção da população global ou a distribuição global que verifica dentro da região ou nação. No entanto, se aplicada ao nível regional ou nacional, deve ser aceito que uma categoria global de ameaça pode não ser a mesma que uma categoria regional ou nacional para um táxon em particular. Por exemplo, taxa classificados como Vulneráveis com base no declínio global na abundância (tamanho da população?) ou distribuição poderiam ser incluídas na categoria de Menor Risco numa região particular onde suas populações são estáveis. Ao contrário, taxa classificados como em Menor Risco podem estar em

Perigo Crítico dentro de uma região em particular, onde a população é pequena ou está em declínio, talvez somente porque eles se encontram nos limites marginais de sua distribuição global. A IUCN continua desenvolvendo diretrizes para o uso de categorias de listas vermelhas nacionais.

## 12. Reavaliação

A avaliação dos taxa em relação aos critérios deverá realizar-se em intervalos apropriados. Isto é especialmente importante para taxa listados como Quase Ameaçados ou Dependentes de Conservação, e para espé-



**Figura 2.** Dois exemplos das diferenças que permitem distinguir entre extensão de ocorrência e área de ocupação. Os pontos de (A) representam a distribuição espacial das localidades em que se encontra um táxon com base na observação, projeção ou inferência. Em (B) são mostrados os possíveis limites da extensão de ocorrência a qual é dada pela avaliação da superfície contidos em tais limites. Em (C) é mostrada uma medida da área de ocupação que pode ser avaliada como a soma dos quadrados da grade que estiverem ocupados.



cies ameaçadas cuja condição se sabe e ou supõe que esteja deteriorando.

### 13. Mudanças Entre Categorias

Existem regras que regem a mudança de taxa entre categorias. São elas: (A) Um táxon pode ser transferido de uma categoria de alta ameaça para outra menor se nenhum dos critérios da categoria mais alta for atendido por 5 anos ou mais. (B) Se a classificação original foi incorreta, o táxon pode ser transferido, sem demora, à categoria apropriada ou eliminado completamente das categorias de ameaça (ver porém Seção 9). (C) A transferência das categorias de risco mais baixas para as mais altas devem ser feitas sem demora.

### 14. Problemas de Escala

A classificação baseada nos tamanhos de distribuição geográfica ou nos padrões de ocupação dos habitats se torna complicada por problemas de escala espacial. Quanto mais detalhada é a escala na qual são mapeadas as distribuições ou habitats dos taxa, menor será a área que se evidencia como ocupada. Mapear em escalas muito pequenas revela mais áreas em que o táxon não tem sido registrado. É impossível prover regras estritas, mas regras gerais para o mapeamento dos taxa ou habitats; a escala mais apropriada dependerá do táxon em questão, e a origem e a globalidade dos dados de distribuição. No entanto, para alguns critérios (por exemplo: Criticamente Ameaçado), os patamares(?) requerem a elaboração de mapas em escala pequena.

## III. DEFINIÇÕES

### 1. População

População é definida como o número total de indivíduos de um táxon. Por razões funcionais, fundamentalmente devido às diferenças entre formas de vida, os números populacionais expressam somente os números de indivíduos maduros (adultos?). No caso de taxa que dependem obrigatoriamente de outro táxon para todo seu ciclo de vida ou parte dele, devem ser usados os valores biológicos apropriados para o táxon hospedeiro.

### 2. Subpopulações

Subpopulações são definidas como grupos distintos em uma população, seja geograficamente ou por outro critério, e nos quais ocorrem pequenos intercâmbios (tipica-

mente, um ou menos indivíduos ou gametas migratórios bem sucedidos, por ano ou menos).

### 3. Indivíduos Maduros

O número de indivíduos é definido como o número de indivíduos, quer seja conhecido, estimado ou inferido, capazes de reproduzir-se. Os seguintes pontos devem ser levados em conta ao se estimar esse número:

- Quando uma população é caracterizada por flutuações naturais, devem se usados os valores mínimos.
- Esta medida visa a contagem dos indivíduos capazes de reproduzir-se, e deve portanto excluir indivíduos que são impedidos de reproduzir-se em estado silvestre em virtude de causas ambientais, comportamentais ou outras.
- No caso de populações com desvios nas proporções de adultos ou sexos, é apropriado usar estimativas mais baixas para o número de indivíduos maduros que levam em conta esse desvio (por exemplo: o tamanho populacional efetivamente estimado).
- As unidades reprodutoras dentro de um mesmo clone devem ser consideradas como indivíduos, exceto quando essas unidades são incapazes de sobreviver sozinhas (por exemplo: corais).
- No caso de taxa que perdem naturalmente todos ou parte dos indivíduos maduros em algum momento do seu ciclo de vida, a estimativa deve ser feita no momento apropriado, quer dizer, quando os indivíduos maduros estão disponíveis para a reprodução.

### 4. Geração

Geração pode ser medida como a idade média dos progenitores na população. Esta é maior que a idade da primeira reprodução, exceto naqueles taxa em que os indivíduos só se reproduzem uma vez.

### 5. Declínio Contínuo

Um declínio contínuo é um declínio<sup>1</sup> contínuo recente, atual ou projetado para o futuro, cujas causas não são conhecidas ou não são adequadamente controladas e portanto tenderá continuar, a menos que se adotem medidas para remediar tais causas. As flutuações naturais normalmente não são consideradas declínio contínuo, mas quando se observa um declínio, este não

deve ser considerado parte de uma flutuação, a menos que haja evidência para considerá-lo como tal.

### 6. Redução

Uma redução (critério A) é um declínio no número de indivíduos maduros de pelo menos a quantidade (%) definida por período de tempo (anos) especificado, embora o declínio não necessariamente continue. Uma redução não deverá ser interpretada com parte de uma flutuação natural, a menos que exista boa evidência para tanto. Tendências decrescentes que são parte de flutuações naturais normalmente não são consideradas como reduções.

### 7. Flutuações Extremas

Flutuações extremas ocorrem em certos taxa para os quais o tamanho da população ou a área de distribuição varia ampla, rápida e frequentemente, tipicamente com uma variação maior de que uma ordem de magnitude (por exemplo: declínio ou incremento de dez vezes).

### 8. Severamente Fragmentado

Considera-se severamente fragmentada a situação em que os riscos de extinção para um táxon resultam do fato da maioria dos indivíduos em um táxon serem encontrados em subpopulações pequenas ou relativamente isoladas. Estas pequenas subpopulações podem chegar à extinção, com uma reduzida probabilidade de recolonização.

### 9. Extensão de Ocorrência

Extensão de ocorrência é definida como a área contida dentro dos menores limites contínuos e imaginários que podem delimitadas para abranger todos os lugares conhecidos, inferidos ou projetados, nos quais um táxon ocorre, excluindo-se os casos de deambulação. Esta medida pode excluir a descontinuidade ou disjunções dentro de uma distribuição geral dos taxa (por exemplo: grandes áreas de habitats claramente inviáveis) (ver, porém, área de ocupação). A extensão de ocorrência pode frequentemente ser medida por um polígono convexo mínimo (o menor polígono no qual nenhum ângulo interno ultrapasse 180 graus e que contenha todos os locais de ocorrência).

<sup>1</sup> No texto em espanhol são especificados os tipos de declínio, quais sejam: extensão da presença; área de ocupação; área, extensão e/ou qualidade do habitat; número de localidades ou subpopulações, número de indivíduos maduros.

## 10. Área de Ocupação

Área de ocupação é definida como a área dentro da sua 'extensão de ocorrência' (ver definição) que é ocupada por um táxon, excluindo os casos de ..... A medida reflete o fato de que o táxon normalmente não ocorrerá ..... de toda a sua extensão de ocorrência, já que esta pode conter habitats iníviáveis. A área de ocupação é a menor área essencial para sobrevivência das populações existentes de um táxon, qualquer que seja o estágio de desenvolvimento (por exemplo: os lugares de nidificação de colônias, áreas de alimentação para taxa migratórios). O tamanho da área de ocupação será uma função da escala em que é medida, e deve efetuar-se em uma escala apropriada aos aspetos relevantes do táxon. Os critérios incluem valores em km<sup>2</sup> e, para que sejam evitados erros na classificação, a área de ocupação deve ser medida em quadrados de grade (ou equivalentes) que sejam suficientemente pequenas (ver Figura 2).

## 11. Localidade

Localidade é definida como uma área geográfica ou ecologicamente distinta na qual um simples evento (por exemplo: poluição) afetará prontamente todos os indivíduos do táxon ali presente. Normalmente mas nem sempre, uma localidade contém toda ou parte de uma subpopulação de táxon, e é tipicamente uma pequena proporção da distribuição total do táxon.

## 12. Análise Quantitativa

A análise quantitativa é definida como a técnica de análise da viabilidade populacional (PVA) ou qualquer outra forma de análise quantitativa em que é estimada a probabilidade de extinção de um táxon ou população, baseada no conhecimento do ciclo de vida e em opções especificadas, com ou sem manejo. Na apresentação dos resultados das análises quantitativas, as equações estruturais e os dados deverão ser explicitados.

## IV. AS CATEGORIAS<sup>2</sup>

### Extinto (EX)

Um táxon está Extinto quando não resta dúvida de que o último animal existente tenha morrido.

### Extinto na Natureza (EW)

Um táxon está Extinto na Natureza quando somente sobrevive em cativeiro ou como população (ou populações) naturalizadas completamente fora de sua distribuição original. Um táxon está supostamente Extinto na natureza quando, pesquisas exaustivas realizadas em habitat conhecido e/ou esperado, em tempos apropriados (diário, sazonal, anual), e em toda a área tradicional de ocorrência não registrarem nenhum indivíduo. As pesquisas devem ser realizadas em períodos apropriados que estejam de acordo com o ciclo de vida e formas de vida do táxon.

### Em Perigo Crítico (CR)

Um táxon está Em Perigo Crítico quando está enfrentando um risco extremamente grande de extinção na Natureza num futuro imediato, conforme definido por qualquer um dos critérios (A a E) mencionados na 15, 16 e 17

### Em Perigo (EN)

Um táxon está Ameaçado quando não está Em Perigo Crítico mas está enfrentando um alto risco de extinção na Natureza num futuro próximo, conforme definido por qualquer um dos critérios (A a E) mencionados nas páginas 17 e 18.

### Vulnerável (VU)

Um táxon está vulnerável quando não está Em Perigo Crítico ou Em Perigo mas está enfrentando um alto risco de extinção na Natureza num futuro a médio prazo, conforme definido por qualquer um dos critérios (A a D) nas páginas 19, 20 e 21.

### Baixo Risco (LR)

Um táxon é considerado com Baixo Risco quando, após avaliação, não satisfaz os critérios para nenhuma das categorias Em Perigo Crítico, Em Perigo, ou Vulnerável. Os Taxa incluídos nesta categoria podem ser divididos em três subcategorias:

1. Dependente de Conservação (cd). Taxa que são focos de um programa de conservação contínuo específico para o táxon ou para o habitat. A cessação desse programa resultaria, dentro de um período de cinco anos, na qualificação do táxon para uma das categorias mencionadas acima.

2. Quase Ameaçado (nt). Taxa que não qualificam-se como Dependente de Conservação, mas está próximo a ser qualificado com Vulneráveis.

3. Preocupação Menor (lc). Taxa que não se qualifica como Dependente de Conservação ou Quase Ameaçado

### Dados Insuficientes (DD)

Um táxon é classificado na categoria Dados Insuficientes quando a informação é inadequada para se fazer uma avaliação direta ou indireta do risco de extinção, tendo por base a distribuição ou status da população. Um táxon dentro desta categoria pode estar bem estudado e sua biologia ser bem conhecida, mas faltarem dados apropriados sobre abundância e/ou distribuição. Dados Insuficientes não é, portanto uma categoria de ameaça ou de Menor Risco. Ao incluir um táxon nesta categoria, indica-se que mais informações são requeridas e se reconhece a possibilidade de que pesquisas futuras mostrem que uma classificação de ameaçada é apropriada. É importante fazer um uso real de todos os dados disponíveis. Em muitos casos deve-se ter bastante cuidado ao escolher entre DD e a condição de ameaçado. A suposição de que a distribuição de um táxon está relativamente circunscrita, e que transcorreu um período de tempo considerável desde o último registro do táxon, pode justificar a condição de ameaçado.

### Não Avaliado (NE)

Um táxon é considerado não avaliado quando ainda não sofreu qualquer avaliação em relação a esses critérios.

## V. OS CRITÉRIOS PARA AS CATEGORIAS EM PERIGO CRÍTICO, EM PERIGO E VULNERÁVEL

### Em Perigo Crítico (CR)

Um táxon encontra-se em Perigo Crítico quando enfrenta, em futuro imediato, um risco extremamente grande de extinção na natureza, conforme definido por qualquer dos seguintes critérios (A a E).

A. Redução da população por qualquer das seguintes formas:

1. Uma redução observada, estimada, inferida ou suposta em pelo menos 80% durante os últimos 10 anos ou 3 gerações, selecionando a maior delas, baseada em qualquer dos

<sup>2</sup> Nota: Como nas categorias anteriores da IUCN, a abreviatura de cada categoria (em parênteses) segue a denominação em inglês quando traduzido para outras línguas.



Tabela 2. Borrador das categorias da lista vermelha da IUCN—fevereiro de 1994.

Qualquer dos seguintes critérios podem ser usados para determinar categorias	Em Perigo Crítico	Em Perigo	Vulnerável
Redução da população	Redução 80% nos últimos 10 anos com base na:	Redução de 50% nos últimos 10 anos ou 2 gerações com base na:	Redução 50% nos últimos 20 anos ou 5 gerações com base na:
	a) observação direta ou b) redução na área ocupada, distribuição e/ou qualidade do habitat ou c) níveis reais ou potenciais de exploração ou d) efeitos da taxa de introdução, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.		
	ou	ou	ou
	Redução 80% /10 anos	Redução 50% em 10 anos ou 2 gerações, prevista para um futuro próximo	Redução 50% em 20 anos ou 5 gerações, prevista para um futuro próximo
Range de distribuição	Estimativa < 100Km² ou área de ocupação estimada < 10Km², e dois dos seguintes:	Estimativa < 5,000Km² ou área de ocupação estimada < 500Km² e dois dos seguintes:	Estimativa < 20,000Km² ou área de ocupação estimada < 2,000Km², e dois dos seguintes:
	Seramente fragmentada ou em uma só localidade	Seramente fragmentada ou em 5 localidades ou menos	Seramente fragmentada ou em 10 localidades ou menos
	Redução em qualquer dos seguintes: a) range de distribuição b) área de ocupação c) área, extensão ou qualidade do habitat d) número de localidades ou de subpopulações e) número de indivíduos maduros Flutuações em qualquer dos seguintes: a) range de distribuição b) área ocupada c) número de localidades ou subpopulações		
Estimativa populacional	Estimativa < 250 indivíduos maduros e: Redução 25% em 3 anos ou uma geração, o que for mais longo ou Redução do número de indivíduos maduros e da estrutura populacional	Estimativa < 2,500 indivíduos maduros e: Redução 15% em 5 anos ou duas gerações, o que for mais longo ou Redução do número de indivíduos maduros e da estrutura populacional	Estimativa < 10,000 indivíduos maduros e: Redução 20% em 10 anos ou 3 gerações, o que for mais longo ou Redução do número de indivíduos maduros e da estrutura populacional
	a) nenhuma população com > 50 indivíduos maduros ou	a) nenhuma população com > 250 indivíduos maduros ou	a) nenhuma população > 1,000 indivíduos maduros ou
	b) todos os indivíduos em uma única subpopulação	b) todos os indivíduos em uma única subpopulação	b) todos os indivíduos em uma única subpopulação
Número de indivíduos maduros	Estimativa < 50 indivíduos maduros	Estimativa < 250 indivíduos maduros	Estimativa < 1,000 indivíduos maduros
Probabilidade de extinção	50% em 5 anos ou 2 gerações, o que for mais longo	20% em 20 anos ou 5 gerações, o que for mais longo	10% em 100 anos

seguintes elementos, os quais por sua vez devem ser especificados:

- (a) observação direta
- (b) um índice de abundância apropriado para o táxon
- (c) uma redução da área de ocupação e na extensão de ocorrência e/ou qualidade do habitat
- (d) níveis reais ou potenciais de exploração
- (e) efeitos da introdução de taxa, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.

2. Uma redução em pelo menos 80%, projetada ou suposta que será alcançada nos 10 anos seguintes ou 3 gerações, selecionando o maior deles, baseada dos pontos (b), (c), (d) ou (e) acima, os quais por sua vez devem ser especificados.

B. Extensão de ocorrência estimada em menos de 100 km<sup>2</sup> ou área de ocupação estimada como menor de 10 km<sup>2</sup>, e estimativas que indiquem qualquer uma das seguintes:

- 1. Severamente fragmentada ou se sabe que só existe em uma única localidade.
- 2. Em declínio contínuo, observado, inferido ou projetado por qualquer dos seguintes elementos:
  - (a) extensão de ocorrência
  - (b) área de ocupação
  - (c) área, extensão e ou qualidade do habitat
  - (d) número de localidades ou subpopulações
  - (e) número de indivíduos maduros.

3. Flutuações extremas em qualquer dos seguintes componentes:

- (a) extensão de ocorrência
- (b) área de ocupação
- (c) número de localidades ou subpopulações
- (d) número de indivíduos maduros.

C. População estimada em números menores de 250 indivíduos maduros e qualquer dos seguintes elementos:

- 1. Um declínio contínuo estimado em pelo menos 25% no período de 3 anos ou de uma geração, selecionando o maior dos dois, ou
- 2. Um declínio contínuo, observado, projetado ou inferido, do número de indivíduos maduros estrutura populacional de qualquer das seguintes formas:
  - (a) severamente fragmentada (por exemplo: quando estima-se que nenhuma subpopulação con-

tém mais 50 indivíduos maduros)  
(b) todos os indivíduos estão em única subpopulação.

D. População estimada em menos de 50 indivíduos maduros.

E. Uma análise quantitativa mostra que a probabilidade de extinção na natureza é de pelo menos 50% nos 10 anos seguintes ou em 3 gerações, selecionando-se o maior deles.

### Em Perigo (EN)

Um táxon encontra-se Em Perigo quando, não estando Em Perigo Crítico, enfrenta um sério risco de extinção na natureza, em futuro próximo, conforme é definido por qualquer dos seguintes critérios (A até E):

A. Redução da população por qualquer das seguintes por qualquer das seguintes formas:

- 1. Uma redução observada, estimada, inferida ou suposta de pelo menos 50% durante os últimos 10 anos ou 3 gerações, selecionando-se o maior deles, baseada em qualquer dos seguintes elementos, os quais por sua vez devem ser especificados:
  - (a) observação direta
  - (b) um índice de abundância apropriado para o táxon
  - (c) uma declínio da área de ocupação e na extensão de ocorrência e/ou qualidade do habitat
  - (d) níveis reais ou potenciais de exploração
  - (e) efeitos da introdução de taxa, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.

2. Uma redução em pelo menos 50%, projetada ou suposta, que será alcançada nos 10 anos seguintes ou 3 gerações, selecionando o maior deles, baseada dos pontos (b), (c), (d) ou (e) acima, os quais por sua vez devem ser especificados.

B. Extensão de ocorrência estimada em menos de 5,000 km<sup>2</sup> ou área de ocupação estimada como menor de 500 km<sup>2</sup>, e estimativas que indiquem qualquer uma das seguintes:

- 1. Severamente fragmentada ou se sabe que existem em não mais de cinco localidades.
- 2. Em declínio contínuo, observado, inferido ou projetado por qualquer dos seguintes elementos:
  - (a) extensão de ocorrência
  - (b) área de ocupação
  - (c) área, extensão e ou qualidade do habitat
  - (d) número de localidades ou

subpopulações

(e) número de indivíduos maduros.

3. Flutuações extremas em qualquer dos seguintes componentes:

- (a) extensão de ocorrência
- (b) área de ocupação
- (c) número de localidades ou subpopulações
- (d) número de indivíduos maduros.

C. População estimada em números menores de 2,500 indivíduos maduros e qualquer dos seguintes elementos:

- 1. Um declínio contínuo estimado em pelo menos 25% no período de 5 anos ou de 2 gerações, selecionando-se o maior dos dois, ou
- 2. Um declínio contínuo, observado, projetado ou inferido, do número de indivíduos maduros estrutura populacional de qualquer das seguintes formas:
  - (a) severamente fragmentada (por exemplo: quando estima-se que nenhuma subpopulação contém mais 250 indivíduos maduros)
  - (b) todos os indivíduos estão em única subpopulação.

D. População estimada em menos de 250 indivíduos maduros.

E. Uma análise quantitativa mostra que a probabilidade de extinção na natureza é de pelo menos 20% nos 20 anos seguintes ou em 5 gerações, selecionando-se o maior deles.

### Vulnerável (VU)

Um táxon encontra-se vulnerável quando, não estando Em Perigo Crítico ou Em Perigo, enfrenta um sério risco de extinção na natureza, a médio prazo, conforme é definido por qualquer dos seguintes critérios (A até E):

A. Redução da população por qualquer das seguintes formas:

- 1. Uma redução observada, estimada, inferida ou suposta de pelo menos 30% durante os últimos 10 anos ou 3 gerações, o que for maior, baseada em qualquer dos seguintes elementos, os quais por sua vez devem ser especificados:
  - (a) observação direta
  - (b) um índice de abundância apropriado para o táxon
  - (c) uma declínio da área de ocupação e na extensão de ocorrência e/ou qualidade do habitat
  - (d) níveis reais ou potenciais de exploração



(e) efeitos da introdução de taxa, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.

2. Uma redução em pelo menos 20%, projetada ou suposta, que será alcançada nos 10 anos seguintes ou 3 gerações, o que for maior, baseada dos pontos (b), (c), (d) ou (e) acima, os quais por sua vez devem ser especificados.

B. Extensão de ocorrência estimada em menos de 20,000 km<sup>2</sup> ou área de ocupação estimada como menor de 2,000 km<sup>2</sup>, e estimativas que indiquem qualquer uma das seguintes:

1. Severamente fragmentada ou quando se sabe que existem em não mais de dez localidades.
2. Em declínio contínuo, observado, inferido ou projetado por qualquer dos seguintes elementos:
  - (a) extensão de ocorrência
  - (b) área de ocupação
  - (c) área, extensão e ou qualidade do habitat
  - (d) número de localidades ou subpopulações
  - (e) número de indivíduos maduros.

ros.

3. Flutuações extremas em qualquer dos seguintes componentes:

- (a) extensão de ocorrência
- (b) área de ocupação
- (c) número de localidades ou subpopulações
- (d) número de indivíduos maduros.

C. População estimada em números menores de 10,000 indivíduos maduros e qualquer dos seguintes elementos:

1. Um declínio contínuo estimado em pelo menos 10% no período de 10 anos ou de 3 gerações, o que for maior, ou
2. Um declínio contínuo, observado, projetado ou inferido, do número de indivíduos maduros e estrutura populacional de qualquer das seguintes formas:
  - (a) severamente fragmentada (por exemplo: quando estima-se que nenhuma subpopulação contém mais 1,000 indivíduos maduros)
  - (b) todos os indivíduos estão em única subpopulação.

D. População muito pequena ou restrita a uma das seguintes formas:

1. População estimada em menos de 1,000 indivíduos maduros.
2. População caracterizada por uma séria restrição em sua área de ocupação (tipicamente menor de 100 km<sup>2</sup>) ou no número de localidades (tipicamente menos de 5). Um táxon nessa condição está sujeito às atividades humanas (ou por eventos estocásticos, cujo impacto é agravado por atividades humanas) em um período de tempo muito pequeno em futuro imprevisível e, assim, chegaria a estar Em Perigo Crítico ou Extinto num período de tempo muito pequeno.

E. Uma análise quantitativa mostra que a probabilidade de extinção na natureza é de pelo menos 10% nos próximos 100 anos.

\*Tradução livre de Jesuina Maria da Rocha e Júnia Beatriz Oliveira Souza e revisão técnica de Francisco de Assis Néo.

Este trabalho será publicado pelo IBAMA/DEVIS

## APPENDIX 3

### 2001 IUCN Red List Categories

VERSION 3.1

Prepared by the

IUCN Species Survival Commission

As approved by the

51st meeting of the IUCN Council

Gland, Switzerland

9 February 2000

#### I. INTRODUCTION

1. The IUCN Red List Categories are intended to be an easily and widely understood system for classifying species at high risk of global extinction. The general aim of the system is to provide an explicit, objective framework for the classification of the broadest range of species according to their extinction risk. However, while the Red List may focus attention on those taxa at the highest risk, it is not the sole means of setting priorities for conservation measures for their protection.

Extensive consultation and testing in the development of the system strongly suggest that it is robust across most organisms.

However, it should be noted that although the system places species into the threatened categories with a high degree of consistency, the criteria do not take into account the life histories of every species. Hence, in certain individual cases, the risk of extinction may be under- or over-estimated.

2. Before 1994 the more subjective threatened species categories used in IUCN Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. Although the need to revise the categories had long been recognized (Fitter and Fitter 1987), the current phase of development only began in 1989 following a request from the IUCN Species Survival

Commission (SSC) Steering Committee to develop a more objective approach. The IUCN Council adopted the new Red List system in 1994.

The IUCN Red List Categories and Criteria have several specific aims:

- To provide a system that can be applied consistently by different people;
- To improve objectivity by providing users with clear guidance on how to evaluate different factors which affect the risk of extinction;
- To provide a system which will facilitate comparisons across widely different taxa;
- To give people using threatened species lists a better understanding of how individual species were classified.

3. Since their adoption by IUCN Council in 1994, the IUCN Red List Categories have become widely recognized internationally, and they are now used in a range of publications and listings produced by IUCN, as well as by numerous governmental and non-governmental organizations. Such broad and extensive use revealed the need for a number of improvements, and SSC was mandated by the 1996 World Conservation Congress (WCC Res. 1.4) to conduct a review of the system (IUCN 1996). This document presents the revisions accepted by the IUCN Council.

The proposals presented in this document result from a continuing process of drafting, consultation and validation. The production of a large number of draft proposals has led to some confusion, especially as each draft has been used for classifying some set of species for conservation purposes. To clarify matters, and to open the way for modifications as and when they become necessary, a system for version numbering has been adopted as follows:

- Version 1.0: Mace and Lande (1991)  
The first paper discussing a new basis for the categories, and presenting numerical 2 criteria especially relevant for large vertebrates.
- Version 2.0: Mace *et al.* (1992)  
A major revision of Version 1.0, including numerical criteria appropriate to all organisms and introducing the non-threatened categories.
- Version 2.1: IUCN (1993)  
Following an extensive consultation process within SSC, a number of changes were made to the details of the criteria, and fuller explanation of basic principles was included. A more explicit structure clarified the significance of the non-threatened categories.
- Version 2.2: Mace and Stuart (1994)  
Following further comments received and additional validation exercises, some minor changes to the criteria were made. In addition, the Susceptible category present in Versions 2.0 and 2.1 was subsumed into the Vulnerable category. A precautionary application of the system was emphasised.
- Version 2.3: IUCN (1994)  
IUCN Council adopted this version, which incorporated changes as a result of comments from IUCN members, in December 1994. The initial version of this document was published without the necessary bibliographic details, such as date of publication and ISBN number, but these were included in the subsequent reprints in 1998 and 1999. This

version was used for the 1996 *IUCN Red List of Threatened Animals* (Baillie and Groombridge 1996), *The World List of Threatened Trees* (Oldfield *et al.* 1998) and the 2000 *IUCN Red List of Threatened Species* (Hilton-Taylor 2000).

- Version 3.0: IUCN/SSC Criteria Review Working Group (1999)

Following comments received, a series of workshops were convened to look at the IUCN Red List Criteria following which, changes were proposed affecting the criteria, the definitions of some key terms and the handling of uncertainty.

- Version 3.1: IUCN (2001)

The IUCN Council adopted this latest version, which incorporated changes as a result of comments from the IUCN and SSC memberships and from a final meeting of the Criteria Review Working Group, in February 2000. All new assessments from January 2001 should use the latest adopted version and cite the year of publication and version number.

4. In the rest of this document, the proposed system is outlined in several sections. Section II, the Preamble, presents basic information about the context and structure of the system, and the procedures that are to be followed in applying the criteria to species. Section III provides definitions of key terms used. Section IV presents the categories, while Section V details the quantitative criteria used for classification within the threatened categories. Annex I provides guidance on how to deal with uncertainty when applying the criteria; Annex II suggests a standard format for citing the Red List Categories and Criteria; and Annex III outlines the documentation requirements for taxa to be included on IUCN's global Red Lists. It is important for the effective functioning of the system that all sections are read and understood to ensure that the definitions and rules are followed. (Note: Annexes I, II and III will be updated on a regular basis.)

## II. PREAMBLE

The information in this section is intended to direct and facilitate the use and interpretation of the categories (Critically Endangered, Endangered, etc.), criteria (A to E), and subcriteria (1, 2, etc.; a, b, etc.; i, ii, etc.).

### 1. Taxonomic Level and Scope of the Categorisation Process

The criteria can be applied to any taxo-

onomic unit at or below the species level. In the following information, definitions and criteria the term 'taxon' is used for convenience, and may represent species or lower taxonomic levels, including forms that are not yet formally described. There is sufficient range among the different criteria to enable the appropriate listing of taxa from the complete taxonomic spectrum, with the exception of micro-organisms. The criteria may also be applied within any specified geographical or political area, although in such cases special notice should be taken of point 14. In presenting the results of applying the criteria, the taxonomic unit and area under consideration should be specified in accordance with the documentation guidelines (see Annex 3). The categorisation process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions. The latter are defined in the IUCN *Guidelines for Re-introductions* (IUCN 1998) as '...an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species' historic range'.

### 2. Nature of the Categories

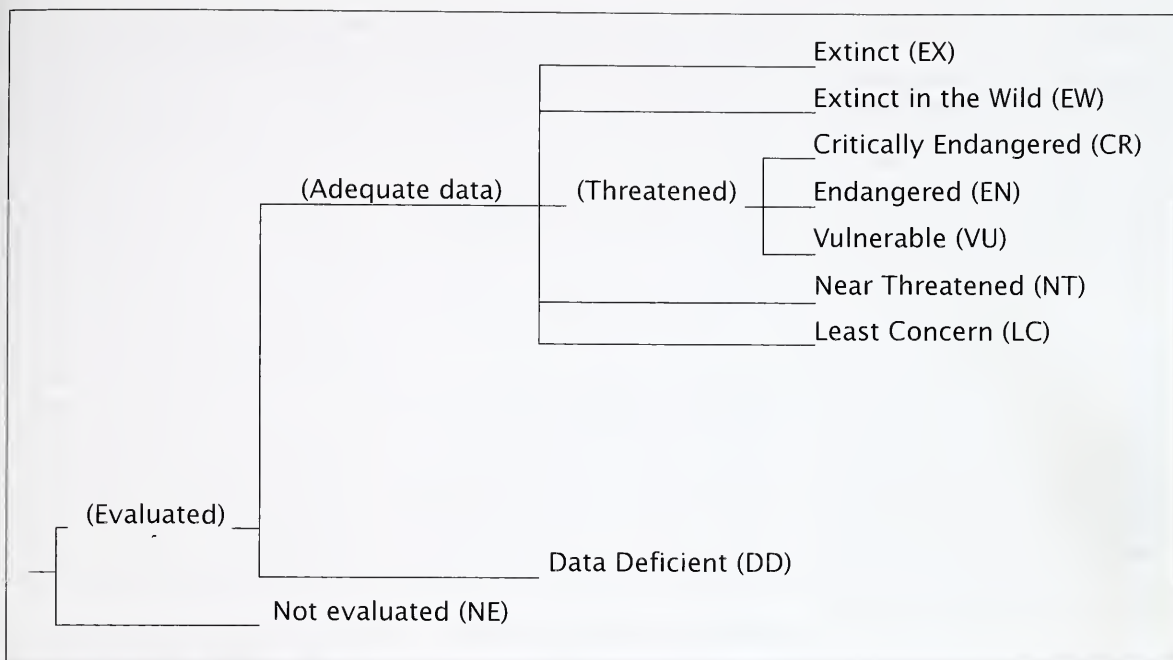
Extinction is a chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the time-frames specified more taxa listed in a higher category are expected to go extinct than those in a lower one (without effective conservation action). However, the persistence of some taxa in high-risk categories does not necessarily mean their initial assessment was inaccurate.

All taxa listed as Critically Endangered qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. Together these categories are described as 'threatened'. The threatened categories form a part of the overall scheme. It will be possible to place all taxa into one of the categories (see Figure 1).

### 3. Role of the Different Criteria

For listing as Critically Endangered, Endangered or Vulnerable there is a range of quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. Each taxon should be evaluated against all the criteria. Even though some criteria will be inappropriate





**Figure 1: Structure of Categories.**

for certain taxa (some taxa will never qualify under these however close to extinction they come), there should be criteria appropriate for assessing threat levels for any taxon. The relevant factor is whether *any one* criterion is met, not whether all are appropriate or all are met. Because it will never be clear in advance which criteria are appropriate for a particular taxon, each taxon should be evaluated against all the criteria, and *all* criteria met at the highest threat category must be listed.

#### 4. Derivation of Quantitative Criteria

The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and the diverse life histories they exhibit. The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation, and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values exists. The levels for different criteria within categories were set independently but against a common standard. Broad consistency between them was sought.

#### 5. Conservation Actions in the Listing Process

The criteria for the threatened categories are to be applied to a taxon whatever the

level of conservation action affecting it. It is important to emphasise here that a taxon may require conservation action even if it is not listed as threatened. Conservation actions which may benefit the taxon are included as part of the documentation requirements (see Annex 3).

#### 6. Data Quality and the Importance of Inference and Projection

The criteria are clearly quantitative in nature. However, the absence of high-quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasised as being acceptable throughout. Inference and projection may be based on extrapolation of current or potential threats into the future (including their rate of change), or of factors related to population abundance or distribution (including dependence on other taxa), so long as these can reasonably be supported. Suspected or inferred patterns in the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified as part of the documentation.

Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distributions, few locations). Some threats need

to be identified particularly early, and appropriate actions taken, because their effects are irreversible or nearly so (e.g., pathogens, invasive organisms, hybridization).

#### 7. Problems of Scale

Classification based on the sizes of geographic ranges or the patterns of habitat occupancy is complicated by problems of spatial scale. The finer the scale at which the distributions or habitats of taxa are mapped, the smaller the area will be that they are found to occupy, and the less likely it will be that range estimates (at least for 'area of occupancy': see Definitions, point 10) exceed the thresholds specified in the criteria. Mapping at finer scales reveals more areas in which the taxon is unrecorded. Conversely, coarse-scale mapping reveals fewer unoccupied areas, resulting in range estimates that are more likely to exceed the thresholds for the threatened categories. The choice of scale at which range is estimated may thus, itself, influence the outcome of Red List assessments and could be a source of inconsistency and bias.

It is impossible to provide any strict but general rules for mapping taxa or habitats; the most appropriate scale will depend on the taxon in question, and the origin and comprehensiveness of the distribution data.

## 8. Uncertainty

The data used to evaluate taxa against the criteria are often estimated with considerable uncertainty. Such uncertainty can arise from any one or all of the following three factors: natural variation, vagueness in the terms and definitions used, and measurement error. The way in which this uncertainty is handled can have a strong influence on the results of an evaluation.

Details of methods recommended for handling uncertainty are included in Annex 1, and assessors are encouraged to read and follow these principles. In general, when uncertainty leads to wide variation in the results of assessments, the range of possible outcomes should be specified. A single category must be chosen and the basis for the decision should be documented; it should be both precautionary and credible.

When data are very uncertain, the category of 'Data Deficient' may be assigned. However, in this case the assessor must provide documentation showing that this category has been assigned because data are inadequate to determine a threat category. It is important to recognize that taxa that are poorly known can often be assigned a threat category on the basis of background information concerning the deterioration of their habitat and/or other causal factors; therefore the liberal use of 'Data Deficient' is discouraged.

## 9. Implications of Listing

Listing in the categories of Not Evaluated and Data Deficient indicates that no assessment of extinction risk has been made, though for different reasons. Until such time as an assessment is made, taxa listed in these categories should not be treated as if they were non-threatened. It may be appropriate (especially for Data Deficient forms) to give them the same degree of attention as threatened taxa, at least until their status can be assessed.

## 10. Documentation

All assessments should be documented. Threatened classifications should state the criteria and subcriteria that were met. No assessment can be accepted for the IUCN Red List as valid unless at least one criterion is given. If more than one criterion or subcriterion is met, then each should be listed. If a re-evaluation indicates that the documented criterion is no longer met, this should not result in automatic reassign-

ment to a lower category of threat (downlisting). Instead, the taxon should be re-evaluated against all the criteria to clarify its status. The factors responsible for qualifying the taxon against the criteria, especially where inference and projection are used, should be documented (see Annexes 2 and 3). The documentation requirements for other categories are also specified in Annex 3.

## 11. Threats and Priorities

The category of threat is not necessarily sufficient to determine priorities for conservation action. The category of threat simply provides an assessment of the extinction risk under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation action such as costs, logistics, chances of success, and other biological characteristics of the subject.

## 12. Re-Evaluation

Re-evaluation of taxa against the criteria should be carried out at appropriate intervals. This is especially important for taxa listed under Near Threatened, Data Deficient and for threatened taxa whose status is known or suspected to be deteriorating.

## 13. Transfer Between Categories

The following rules govern the movement of taxa between categories:

A. A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has been met for five years or more.

B. If the original classification is found to have been erroneous, the taxon may be transferred to the appropriate category or removed from the threatened categories altogether, without delay (but see Point 10 above).

C. Transfer from categories of lower to higher risk should be made without delay.

## 14. Use at Regional Level

The IUCN Red List Categories and Criteria were designed for global taxon assessments.

However, many people are interested in applying them to subsets of global data, especially at regional, national or local levels. To do this it is important to refer to

guidelines prepared by the IUCN/SSC Regional Applications Working Group (e.g., Gärdenfors *et al.* 1999). When applied at national or regional levels it must be recognized that a global category may not be the same as a national or regional category for a particular taxon. For example, taxa classified as Least Concern globally might be Critically Endangered within a particular region where numbers are very small or declining, perhaps only because they are at the margins of their global range. Conversely, taxa classified as Vulnerable on the basis of their global declines in numbers or range might be Least Concern within a particular region where their populations are stable. It is also important to note that taxa endemic to regions or nations will be assessed globally in any regional or national applications of the criteria, and in these cases great care must be taken to check that an assessment has not already been undertaken by a Red List Authority (RLA), and that the categorisation is agreed with the relevant RLA (e.g., an SSC Specialist Group known to cover the taxon).

## III. DEFINITIONS

### 1. Population and Population Size (Criteria A, C and D)

The term 'population' is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life forms, population size is measured as numbers of mature individuals only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

### 2. Subpopulations (Criteria B and C)

Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less).

### 3. Mature Individuals (Criteria A, B, C and D)

The number of mature individuals is the number of individuals known, estimated or inferred to be capable of reproduction. When estimating this quantity, the following points should be borne in mind:

- Mature individuals that will never pro-



duce new recruits should not be counted (e.g. densities are too low for fertilization).

- In the case of populations with biased adult or breeding sex ratios, it is appropriate to use lower estimates for the number of mature individuals, which take this into account.
- Where the population size fluctuates, use a lower estimate. In most cases this will be much less than the mean.
- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals).
- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.
- Re-introduced individuals must have produced viable offspring before they are counted as mature individuals.

#### 4. Generation (Criteria A, C and E)

Generation length is the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural, i.e. pre-disturbance, generation length should be used.

#### 5. Reduction (Criterion A)

A reduction is a decline in the number of mature individuals of at least the amount (%) stated under the criterion over the time period (years) specified, although the decline need not be continuing. A reduction should not be interpreted as part of a fluctuation unless there is good evidence for this. The downward phase of a fluctuation will not normally count as a reduction.

#### 6. Continuing Decline (Criteria B and C)

A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken.

Fluctuations will not normally count as continuing declines, but an observed de-

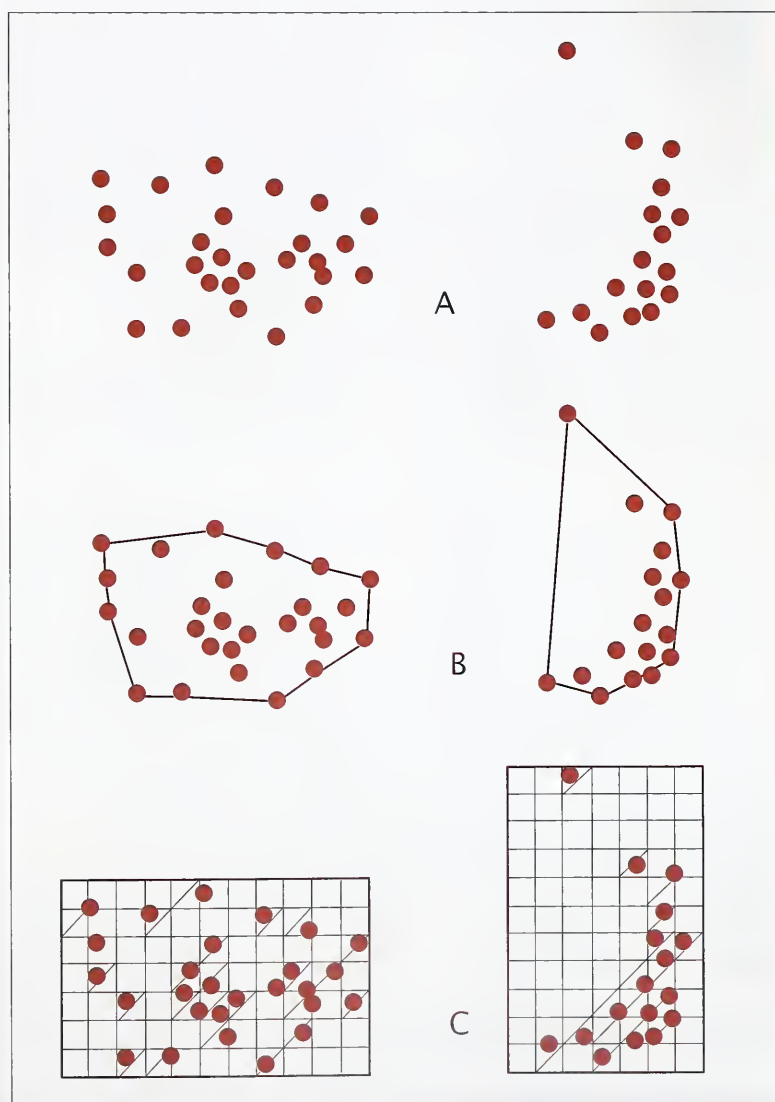
cline should not be considered as a fluctuation unless there is evidence for this.

#### 7. Extreme Fluctuations (Criteria B and C)

Extreme fluctuations can be said to occur in a number of taxa when population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e. a tenfold increase or decrease).

#### 8. Severely Fragmented (Criterion B)

The phrase 'severely fragmented' refers to the situation in which increased extinction risk to the taxon results from the fact that most of its individuals are found in small and relatively isolated subpopulations (in certain circumstances this may be inferred from habitat information). These small subpopulations may go extinct, with a reduced probability of recolonization.



**Figure 2.** Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of present occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be achieved by the sum of the occupied grid squares.

### 9. Extent of Occurrence (Criteria A and B)

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy (see Figure 2). This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy', point 10 below). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

### 10. Area of Occupancy (Criteria A, B and D)

Area of occupancy is defined as the area within its 'extent of occurrence' (see point 9 above) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. irreplaceable colonial nesting sites, crucial feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data (see point 7 in the Preamble). To avoid inconsistencies and bias in assessments caused by estimating area of occupancy at different scales, it may be necessary to standardize estimates by applying a scale correction factor. It is difficult to give strict guidance on how standardization should be done because different types of taxa have different scale-area relationships.

### 11. Location (Criteria B and D)

The term 'location' defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may in-

clude part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.

### 12. Quantitative Analysis (Criterion E)

A quantitative analysis is defined here as any form of analysis which estimates the extinction probability of a taxon based on known life history, habitat requirements, threats and any specified management options. Population viability analysis (PVA) is one such technique. Quantitative analyses should make full use of all relevant available data. In a situation in which there is limited information, such data as are available can be used to provide an estimate of extinction risk (for instance, estimating the impact of stochastic events on habitat). In presenting the results of quantitative analyses, the assumptions (which must be appropriate and defensible), the data used and the uncertainty in the data or quantitative model must be documented.

## IV. THE CATEGORIES<sup>1</sup>

A representation of the relationships between the categories is shown in Figure 1.

### EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

### EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

### CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

### ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

### VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

### NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

### LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

### DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat.

Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research

<sup>1</sup> Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages (see Annex 2).



will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

#### NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

### V. THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

#### CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of  $\geq 90\%$  over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
  - (a) direct observation
  - (b) an index of abundance appropriate to the taxon
  - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
  - (d) actual or potential levels of exploitation
  - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of  $\geq 80\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of  $\geq 80\%$ , projected or suspected to be met within the next 10 years or three generations, whichever is the longer

(up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of  $\geq 80\%$  over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 100 km<sup>2</sup>, and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at only a single location.
- b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) number of locations or subpopulations
- (iv) number of mature individuals.

2. Area of occupancy estimated to be less than 10 km<sup>2</sup>, and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at only a single location.
- b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy

(iii) number of locations or subpopulations

(iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:

(i) no subpopulation estimated to contain more than 50 mature individuals, OR

(ii) at least 90% of mature individuals in one subpopulation.

(b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

#### ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of  $\geq 70\%$  over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

- (a) direct observation
- (b) an index of abundance appropriate to the taxon
- (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- (d) actual or potential levels of exploitation
- (e) the effects of introduced taxa, hybridization, pathogens, pollut-

ants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of  $\geq 50\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of  $\geq 50\%$ , projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of  $\geq 50\%$  over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 5,000 km<sup>2</sup>, and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than five locations.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) number of locations or subpopulations
- (iv) number of mature individuals.

2. Area of occupancy estimated to be less than 500 km<sup>2</sup>, and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than five loca-

tions.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) number of locations or subpopulations
- (iv) number of mature individuals.

C. Population size estimated to number fewer than 2,500 mature individuals and either:

1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:

- (i) no subpopulation estimated to contain more than 250 mature individuals, OR
- (ii) at least 95% of mature individuals in one subpopulation.

(b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).

### VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of  $\geq 50\%$  over the last 10 years or three generations, whichever is the longer, where the causes of the

reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

- (a) direct observation
- (b) an index of abundance appropriate to the taxon
- (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- (d) actual or potential levels of exploitation
- (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of  $\geq 30\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of  $\geq 30\%$ , projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of  $\geq 30\%$  over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 20,000 km<sup>2</sup>, and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than 10 locations.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.



- c. Extreme fluctuations in any of the following:
  - (i) extent of occurrence
  - (ii) area of occupancy
  - (iii) number of locations or subpopulations
  - (iv) number of mature individuals.
- 2. Area of occupancy estimated to be less than 2,000 km<sup>2</sup>, and estimates indicating at least two of a-c:
  - a. Severely fragmented or known to exist at no more than 10 locations.
  - b. Continuing decline, observed, inferred or projected, in any of the following:
    - (i) extent of occurrence
    - (ii) area of occupancy
    - (iii) area, extent and/or quality of habitat
    - (iv) number of locations or subpopulations
    - (v) number of mature individuals.
  - c. Extreme fluctuations in any of the following:
    - (i) extent of occurrence
    - (ii) area of occupancy
    - (iii) number of locations or subpopulations
    - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
  - 1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
  - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
    - (a) Population structure in the form of one of the following:
      - (i) no subpopulation estimated to contain more than 1,000 mature individuals, OR
      - (ii) all mature individuals are in one subpopulation.
    - (b) Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
  - 1. Population size estimated to number fewer than 1,000 mature individuals.
  - 2. Population with a very restricted area of occupancy (typically less than 20 km<sup>2</sup>) or number of locations (typically five or fewer) such that it

is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.

E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

## Annex 1: Uncertainty

The Red List Criteria should be applied to a taxon based on the available evidence concerning its numbers, trend and distribution. In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, a threatened listing may be justified, even though there may be little direct information on the biological status of the taxon itself. In all these instances there are uncertainties associated with the available information and how it was obtained. These uncertainties may be categorised as natural variability, semantic uncertainty and measurement error (Akçakaya *et al.* 2000). This section provides guidance on how to recognize and deal with these uncertainties when using the criteria.

Natural variability results from the fact that species' life histories and the environments in which they live change over time and space. The effect of this variation on the criteria is limited, because each parameter refers to a specific time or spatial scale. Semantic uncertainty arises from vagueness in the definition of terms or lack of consistency in different assessors' usage of them. Despite attempts to make the definitions of the terms used in the criteria exact, in some cases this is not possible without the loss of generality. Measurement error is often the largest source of uncertainty; it arises from the lack of precise information about the parameters used in the criteria. This may be due to inaccuracies in estimating the values or a lack of knowledge. Measurement error may be reduced or eliminated by acquiring additional data. For further details, see Akçakaya *et al.* (2000) and Burgman *et al.* (1999).

One of the simplest ways to represent uncertainty is to specify a best estimate and a range of plausible values. The best estimate itself might be a range, but in any case the best estimate should always be included in the range of plausible values. When data are very uncertain, the range for the best estimate might be the range of plausible

values. There are various methods that can be used to establish the plausible range. It may be based on confidence intervals, the opinion of a single expert, or the consensus opinion of a group of experts. Whichever method is used should be stated and justified in the documentation.

When interpreting and using uncertain data, attitudes toward risk and uncertainty may play an important role. Attitudes have two components. First, assessors need to consider whether they will include the full range of plausible values in assessments, or whether they will exclude extreme values from consideration (known as dispute tolerance). An assessor with a low dispute tolerance would include all values, thereby increasing the uncertainty, whereas an assessor with a high dispute tolerance would exclude extremes, reducing the uncertainty. Second, assessors need to consider whether they have a precautionary or evidentiary attitude to risk (known as risk tolerance). A precautionary attitude will classify a taxon as threatened unless it is certain that it is not threatened, whereas an evidentiary attitude will classify a taxon as threatened only when there is strong evidence to support a threatened classification.

Assessors should resist an evidentiary attitude and adopt a precautionary but realistic attitude to uncertainty when applying the criteria, for example, by using plausible lower bounds, rather than best estimates, in determining population size, especially if it is fluctuating. All attitudes should be explicitly documented.

An assessment using a point estimate (i.e. single numerical value) will lead to a single Red List Category. However, when a plausible range for each parameter is used to evaluate the criteria, a range of categories may be obtained, reflecting the uncertainties in the data. A single category, based on a specific attitude to uncertainty, should always be listed along with the criteria met, while the range of plausible categories should be indicated in the documentation (see Annex 3).

Where data are so uncertain that any category is plausible, the category of 'Data Deficient' should be assigned. However, it is important to recognize that this category indicates that the data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known or indeed not threatened. Although Data Deficient is not a threatened category, it indicates a need to obtain more

information on a taxon to determine the appropriate listing; moreover, it requires documentation with whatever available information there is.

## Annex 2: Citation of the IUCN Red List Categories and Criteria

In order to promote the use of a standard format for citing the Red List Categories and Criteria the following forms of citation are recommended:

1). The Red List Category may be written out in full or abbreviated as follows (when translated into other languages, the abbreviations should follow the English denominations):

Extinct, EX  
Extinct in the Wild, EW  
Critically Endangered, CR  
Endangered, EN  
Vulnerable, VU  
Near Threatened, NT  
Least Concern, LC  
Data Deficient, DD  
Not Evaluated, NE

2). Under Section V (the criteria for Critically Endangered, Endangered and Vulnerable) there is a hierarchical alphanumeric numbering system of criteria and subcriteria. These criteria and subcriteria (all three levels) form an integral part of the Red List assessment and all those that result in the assignment of a threatened category must be specified after the Category. Under the criteria A to C and D under Vulnerable, the first level of the hierarchy is indicated by the use of numbers (1-4) and if more than one is met, they are separated by means of the '+' symbol. The second level is indicated by the use of the lower-case alphabet characters (a-e). These are listed without any punctuation. A third level of the hierarchy under Criteria B and C involves the use of lower case roman numerals (i-v). These are placed in parentheses (with no space between the preceding alphabet character and start of the parenthesis) and separated by the use of commas if more than one is listed. Where more than one criterion is met, they should be separated by semicolons. The following are examples of such usage:

EX  
CRA1cd  
VU A2c+3c  
EN B1ac(i,ii,iii)  
EN A2c; D  
VU D1+2  
CRA2c+3c; B1ab(iii)  
CR D

VU D2  
EN B2ab(i,ii,iii)  
VU C2a(ii)  
EN A1c; B1ab(iii); C2a(i)  
EN B2b(iii)c(ii)  
EN B1ab(i,ii,v)c(iii,iv)+2b(i)c(ii,v)  
VU B1ab(iii)+2ab(iii)  
EN A2abc+3bc+4abc;  
B1b(iii,iv,v)c(ii,iii,iv)+2b(iii,iv,v)  
c(ii,iii,iv)

## Annex 3: Documentation Requirements for Taxa Included on the IUCN Red List

The following is the minimum set of information, which should accompany every assessment submitted for incorporation into the *IUCN Red List of Threatened Species*<sup>TM</sup>:

- Scientific name including authority details
- English common name/s and any other widely used common names (specify the language of each name supplied)
- Red List Category and Criteria
- Countries of occurrence (including country subdivisions for large nations, e.g. states within the USA, and overseas territories, e.g. islands far from the mainland country)
- For marine species, the Fisheries Areas in which they occur should be recorded (see <http://www.iucn.org/themes/ssc/sis/faomap.htm> for the Fisheries Areas as delimited by FAO, the Food and Agriculture Organization of the United Nations)
- For inland water species, the names of the river systems, lakes, etc. to which they are confined
- A map showing the geographic distribution (extent of occurrence)
- A rationale for the listing (including any numerical data, inferences or uncertainty that relate to the criteria and their thresholds)
- Current population trends (increasing, decreasing, stable or unknown)
- Habitat preferences (using a modified version of the Global Land Cover Characterization (GLCC) classification which is available electronically from <http://www.iucn.org/themes/ssc/sis/authority.htm> or on request from [redlist@ssc-uk.org](mailto:redlist@ssc-uk.org))
- Major threats (indicating past, current and future threats using a standard classification which is available from the SSC web site or e-mail address as shown above)
- Conservation measures, (indicating both current and proposed measures

using a standard classification which is available from the SSC web site or e-mail address as shown above)

- Information on any changes in the Red List status of the taxon, and why the status has changed
- Data sources (cited in full; including unpublished sources and personal communications)
- Name/s and contact details of the assessor/s
- Before inclusion on the IUCN Red List, all assessments will be evaluated by at least two members of a Red List Authority. The Red List Authority is appointed by the Chair of the IUCN Species Survival Commission and is usually a subgroup of a Specialist Group. The names of the evaluators will appear with each assessment.

In addition to the minimum documentation, the following information should also be supplied where appropriate:

- If a quantitative analysis is used for the assessment (i.e. Criterion E), the data, assumptions and structural equations (e.g., in the case of a Population Viability Analysis) should be included as part of the documentation.
- For Extinct or Extinct in the Wild taxa, extra documentation is required indicating the effective date of extinction, possible causes of the extinction and the details of surveys which have been conducted to search for the taxon.
- For taxa listed as Near Threatened, the rationale for listing should include a discussion of the criteria that are nearly met or the reasons for highlighting the taxon (e.g., they are dependent on ongoing conservation measures).
- For taxa listed as Data Deficient, the documentation should include what little information is available.

Assessments may be made using version 2.0 of the software package RAMAS<sup>®</sup> Red List (Akçakaya and Ferson 2001). This program assigns taxa to Red List Categories according to the rules of the IUCN Red List Criteria and has the advantage of being able to explicitly handle uncertainty in the data. The software captures most of the information required for the documentation above, but in some cases the information will be reported differently. The following points should be noted:

- If RAMAS<sup>®</sup> Red List is used to obtain a listing, this should be stated.
- Uncertain values should be entered into the program as a best estimate and a plausible range, or as an interval (see the



RAMAS<sup>®</sup> Red List manual or help files for further details).

- The settings for attitude towards risk and uncertainty (i.e. dispute tolerance, risk tolerance and burden of proof) are all pre-set at a mid-point. If any of these settings are changed this should be documented and fully justified, especially if a less precautionary position is adopted.
- Depending on the uncertainties, the resulting classification can be a single category and/or a range of plausible categories. In such instances, the following approach should be adopted (the program will usually indicate this automatically in the Results window):
  - If the range of plausible categories extends across two or more of the threatened categories (e.g. Critically Endangered to Vulnerable) and no preferred category is indicated, the precautionary approach is to take the highest category shown, i.e. CR in the above example. In such cases, the range of plausible categories should be documented under the rationale including a note that a precautionary approach was followed in order to distinguish it from the situation in the next point. The following notation has been suggested e.g. CR\* (CR-VU).
  - If a range of plausible categories is given and a preferred category is indicated, the rationale should indicate the range of plausible categories met e.g. EN (CR-VU).
  - The program specifies the criteria that contributed to the listing (see Status window). However, when data are uncertain, the listing criteria are approximate, and in some cases may not be determined at all. In such cases, the assessors should use the Text results to determine or verify the criteria and sub-criteria met. Listing criteria derived in this way must be clearly indicated in the rationale (refer to the RAMAS<sup>®</sup> Red List Help menu for further guidance on this issue).
  - If the preferred category is indicated as Least Concern, but the plausible

range extends into the threatened categories, a listing of 'Near Threatened' (NT) should be used. The criteria, which triggered the extension into the threatened range, should be recorded under the rationale.

- Any assessments made using this software must be submitted with the RAMAS<sup>®</sup> Red List input files (i.e. the \*.RED files).

New global assessments or reassessments of taxa currently on the IUCN Red List, may be submitted to the IUCN/SSC Red List Programme Officer for incorporation (subject to peer review) in a future edition of the *IUCN Red List of Threatened Species*<sup>™</sup>. Submissions from within the SSC network should preferably be made using the Species Information Service (SIS) database. Other submissions may be submitted electronically; these should preferably be as files produced using RAMAS<sup>®</sup> Red List or any of the programs in Microsoft Office 97 (or earlier versions) e.g. Word, Excel or Access. Submissions should be sent to:

IUCN/SSC Red List Programme, IUCN/SSC UK Office, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom. Fax: +44-(0)1223-277845; Email: redlist@ssc-uk.org.

For further clarification or information about the IUCN Red List Criteria, documentation requirements (including the standards used) or submission of assessments, please contact the IUCN/SSC Red List Programme Officer at the address shown above.

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## Draft Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels

Ulf Gärdenfors (Sweden), Jon Paul Rodríguez (Venezuela), Craig Hilton-Taylor (South Africa), Colleen Hyslop (Canada), Georgina Mace (UK), Sanjay Molur (India) and Stuart Poss (USA)

### Background

Red Lists and Red Data Books are among the most widely used conservation tools available to conservationists world wide for focussing attention on species of conservation concern. These publications are essentially catalogues of threatened species where each entry consists of a species and a threatened category that provides an easily and widely understood method for highlighting those species under higher extinction risk. Prior to 1994, the threatened categories used in Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. The need to revise the categories had been recognised since 1984, when the Species Survival Commission (SSC) held a symposium, 'The Road to Extinction' (Fitter and Fitter 1987). However, despite close examination of all the issues, no single revision of the system was proposed. In the early 1990s, The World Conservation Union (IUCN) under the auspices of the SSC, initiated a process for revising the Red List Categories. The main objective of this revision was to increase the objectivity and repeatability of the assessment process, as well as to develop quantifiable criteria that assign categories only on the basis of extinction risk. In 1994, the IUCN Council adopted the new Red List Categories and Criteria (IUCN 1994) which enable the assessment of the extinction risk of species or lower taxa at the global scale. The system was not designed with the intention that it be used at a sub-global level for the assessment of only a portion of the global population of a taxon. However, in many countries and regions, there is a strong desire to produce national or regional Red Lists based on comparable categories and criteria as used at the global level. The problem in applying the global system is that estimating extinction risk in a portion of a species' range may be different from the assessment of extinction risk at a global level, and the direct application of the existing criteria is not always possible.

The regional application issue was discussed at two SSC workshops held in Gland, Switzerland in March 1995 and in Cambridge, England in December 1995 (see Gärdenfors 1995), and by Gärdenfors (1996) and Gärdenfors and Kindvall (1999). It has also been discussed by several authors with reference to particular countries or regions, e.g. Avery *et al.* (1994), de Lange and Norton (1998), Maes and Swaay (1997), Palmer *et al.* (1997), Rodríguez and Rojas-Suárez (1995), Schnittler *et al.* (1994), Swaay *et al.* (1997). Recognising the need for coherent criteria for the application of Red List categories at sub-global scales (e.g. sub-national, national or larger regions), the first World Conservation Congress held in Montreal in 1996, adopted a resolution (WCC Res. D. 1.25) that "Requests the SSC, within available resources, to complete the development of guidelines for using the IUCN Red List Categories at the regional level as soon as it is practicable...".

In 1998, a Regional Application Working Group (RAWG) was formed under the SSC Red List Programme Subcommittee. The first meeting of the RAWG was held in Montreal, Canada in October 1998. This draft of the 'Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels', hereafter referred to as the 'Guidelines', is the result of proposals made at that meeting, subsequent correspondence between members of the group, and comments at training workshops held in Canada and Australia. The Guidelines will be revised by the RAWG following the receipt of comments, a period of testing and a series of regional workshops. The revised Guidelines will also take into account the proposed changes to the Red List Categories and Criteria (Criteria Review Working Group 1999). A final version of the guidelines will be presented to the IUCN Council at the World Conservation Congress in October 2000.

This draft version provides IUCN and SSC

members an opportunity to comment on the Guidelines. We invite people to submit their comments and suggestions for amendments (preferably as well-formulated alternatives) to:

Craig Hilton-Taylor, Red List Programme Officer, IUCN/SSC UK Office, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom. Fax: +44-1223-277845, Email: [redlist@ssc-uk.org](mailto:redlist@ssc-uk.org) OR [craig.hilton-taylor@ssc-uk.org](mailto:craig.hilton-taylor@ssc-uk.org).

### Draft Guidelines

#### Introduction

The IUCN Red List Categories and Criteria are described in detail in a red booklet published recently (IUCN 1994), and reproduced in Baillie and Groombridge (1996), Oldfield *et al.* (1998) and on the IUCN/SSC web site (<http://iucn.org/themes/ssc/siteindex.htm>). The Guidelines presented below require a thorough knowledge of the definitions and rules of the Red List Categories and Criteria. Familiarity with the publications mentioned above is therefore strongly recommended.

The Guidelines can be applied to any taxonomic unit at or below the species level. The term 'taxon' in the Guidelines is used for convenience, and may represent species or lower taxonomic levels. The term 'region' is also used to denote any sub-global geographical area (e.g. continent, country, state or province).

#### Summary of the Issues

Provided the regional population to be assessed is isolated from conspecific populations outside the region, the (global) Red List Criteria (IUCN 1994) can be used in a straightforward manner. The extinction risk of such an isolated population is identical to an endemic taxon. In these situations, the criteria can be used with unaltered thresholds at *any* geographical



scale. However, if the criteria are applied to part of a population cut by a geo-political border, or to a regional population occasionally interchanging individuals with other populations beyond the border, the thresholds under Criteria A-D may no longer correspond to the extinction risk expressed in Criterion E.

Within a particular region, there will be a mixture of taxa with different distribution histories, ranging from being indigenous (native to the area) since pre-human settlement to recently and purposefully introduced by people. Besides reproducing taxa, there will also be taxa that do not reproduce in the region but still utilise (and may be dependent upon) resources; they are visitors to the region. There may also be formerly native taxa that are now extinct in the region but which are still extant in other parts of the world. All these situations require recommendations on how they should be handled in regional Red List assessments.

The Red List Categories, whether used at the global or regional level, reflect the extinction risk of a taxon, but not necessarily a particular priority for conservation. This distinction will be even more important to realise and recognise at the regional level where the setting of conservation priorities should be viewed in a larger perspective.

### Definitions

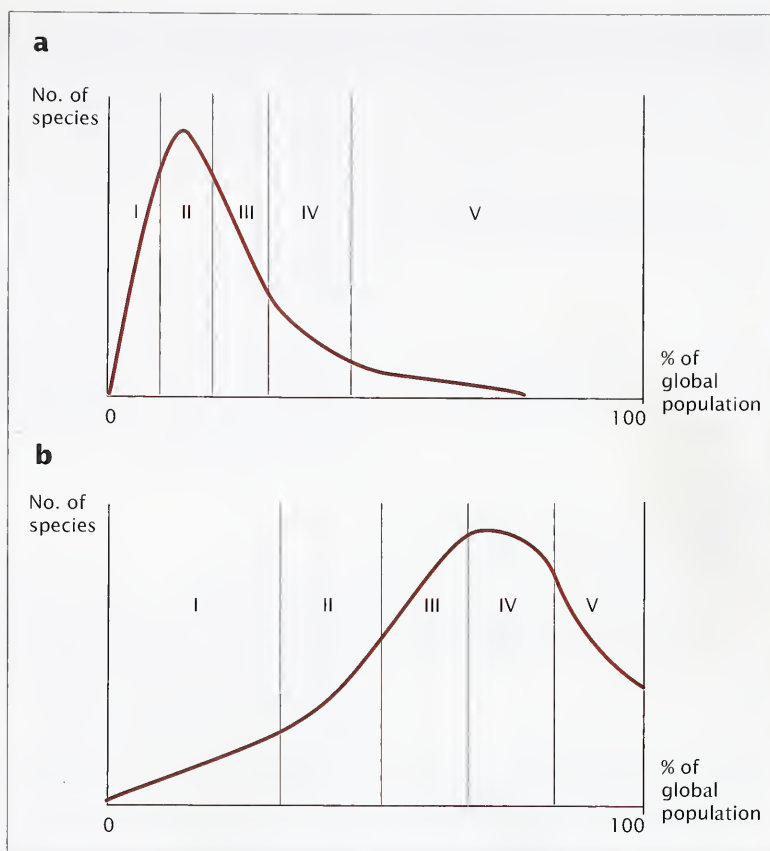
#### Benign Introduction

An attempt to establish a taxon, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area (IUCN 1998).

#### Class I-(III)V of Global Population Share

The proportion of the global population occurring within the study region is measured in three or five classes (see examples in Figure 1). The number of classes chosen is to be decided by regional assessors since the distribution of proportions will vary widely among regions.

Class I, indicates the lowest proportion, and classes III or V the highest. The proportion of total population size may, in the absence of good information, be estimated from known or estimated geographical distribution and/or suitable habitat. The delimitation of the classes will depend on the size of the region (i.e. how large a proportion of the global population of the taxon tend



**Figure 1: Examples of definitions of classes denoting global population share within two regions of different size. a.** In a small region, most species tend to have a small share of the total population, while very few or none are endemic to the region. Therefore, to get an informative delimitation the classes must be skewed towards lower percentages. **b.** In a large region, most of the taxa tend to have a large proportion of the global population and many are endemic. Therefore, the classes must be skewed towards higher percentages. The percentages used to delimit the classes must be clearly stated in the regional Red List.

to occur within the region); and the width of classes need not to be identical. The percentages used to delimit the classes must be clearly stated in the regional Red List.

#### Conspecific Populations

Populations of the same taxon found in different geographical locations.

#### Current Range

Present geographical distribution of the taxon.

#### Downgrading and Upgrading

The process for adjusting the Red List Category of a regional population according to the decreased or increased risk of extinction.

#### Endemic Taxon

A taxon is endemic to an area if it is found

only there and nowhere else. It is a relative term. A taxon can be endemic to a small island, to a country or a continent.

#### Global Population

Total number of individuals of the taxon living in the wild.

#### Isolated Population

A population of the taxon that does not (or only exceptionally) exchange conspecific individuals or gametes with any other populations, and whose expected risk of extinction is therefore unaffected by other populations.

#### Natural Range

The range of a taxon, *excluding* any portion that is the result of intentional or accidental introductions to the region or a

neighbouring region after the year 1800 or 1900, respectively. Taxa introduced intentionally before 1800 should also have developed local adaptations to be regarded as being within their natural range. The natural range includes areas where the taxon does not breed but regularly utilises resources, such as feeding grounds or watering sites during migration, as well as wintering areas.

### Propagule

Any live entity capable of dispersal and of producing a new mature individual, e.g. a spore, seed, fruit, egg, larva, part of or entire individual.

### Region

Any sub-global geographical area, such as continent, country, state or province.

### Regional Assessment

Process for assessing the extinction risk of a regional population according to the guidelines given here.

### Regionally Extinct (RE)

A taxon is Regionally Extinct when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or if a former visiting taxon, the last individual has died or disappeared from the region.

### Regional Population

The portion of the global population within the area being studied. This may comprise one or more subpopulations.

### Rescue Effect

Immigrating propagules result in a lower extinction risk of the target population.

### Subpopulations

Subpopulations are defined (IUCN 1994) as geographically or otherwise distinct groups in the global population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

### Taxon

Any species or infra-specific taxon whose extinction risk is being assessed.

### Vagrant

A taxon that occurs within the boundaries of the region only occasionally or, occurred during the 20th century. The region would therefore only have a very small share of the global population (i.e. Class I). See *Visitor*.

### Visitor = Visiting Taxon

A taxon that does not reproduce within the region but regularly occurs within its boundaries. During any considerable period of the 20th century, the share of the global population in the region would have been at least Class II. See *Vagrant*.

### Wild Population

A population within its natural range where the individuals are the result of natural reproduction, i.e. not the result of human mediated release, translocation or sowing. If, a population is the result of a benign introduction using individuals genetically similar to the original stock, the population is considered to be wild.

### The Assessment

#### Taxa to be Assessed

The criteria should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (IUCN 1994). Taxa only marginally within the region should not be precluded from entering the assessment process. However, a taxon that occasionally breeds under favourable circumstances in the region, only to go extinct after a short period, should not be considered for the regional Red List. Similarly, a taxon that is currently expanding its distributional range outside the region and appears to be in a colonisation phase within the region should not be considered for regional assessment until the taxon has reproduced within the region for several years.

Visiting taxa, i.e. taxa not reproducing within the Region but regularly visiting the country as migrants or wintering/summering populations, may be assessed against the Criteria.

### The Categories

The IUCN Red List Categories (IUCN 1994) should be used unaltered at regional levels, with two exceptions:

1. Taxa extinct within the region but extant in other parts of the world should be classified as Regionally Extinct (RE). A taxon is Regionally Extinct when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, if a former visiting taxon, no individuals visit the region any more. Populations of long-lived individuals that currently have ceased to reproduce within the region because of poor or insufficient

environmental conditions should not be classified as RE. The rationale behind this is that the environment might change and the remaining individuals might start to reproduce again. The classification of visiting taxa as RE will be determined by the assessors using information from any monitoring efforts devoted to the taxon within the region and the species' known faith to its breeding areas.

2. The category *Extinct in the Wild (EW)* should be assigned only to taxa that are extinct in the wild over their entire natural range, including the region, but extant in cultivation, in captivity, or as a naturalised population (or populations) well outside their historical range. If a taxon is (globally) *EW* but extant in a naturalised population within the region, the regional population should be viewed as result of a benign introduction and, consequently, assessed according to the Red List Criteria.

### The Assessment Procedure

The regional assessment should be carried out in a two-step process. For the first step the global criteria are applied to the regional population of the taxon (as specified by IUCN 1994), resulting in a preliminary categorisation. All data used in this initial assessment (e.g. number of individuals and variables relating to area, reduction, decline, fluctuations, subpopulations, locations, fragmentation, etc.) should be from the regional population, not the global population. In the second step, the occurrence of any conspecific populations outside the region that may affect the risk of extinction within the region should be investigated. If the taxon is endemic to the region or the regional population is isolated, the Red List Category defined by the criteria should be adopted unaltered. If, on the other hand, there are conspecific populations outside the region that are judged to affect the regional extinction risk, the regional Red List Category should be changed to a more appropriate level, to reflect the extinction risk as defined by Criterion E (see Figure 2). In most cases, this will mean downgrading the category met by the global criteria, since populations within the region may experience a 'rescue effect' by populations outside the region (Hanski 1991, Hanski and Gyllenberg 1993). In other words, immigration from outside the region will tend to decrease extinction risk within the region. Normally, such a downgrading will involve a one step change in category, e.g. moving the category from *Endangered (EN)* to *Vulnerable*



**Table 1. To judge whether any extra-regional populations may effect the extinction risk of the regional population, the check-list in the table below should be considered.**

Questions	Comments
<b>Likelihood of propagule migration</b> Are there any conspecific populations outside the region within a distance from which propagules could reach the region? Are there any effective barriers preventing dispersal to and from neighbouring populations? Is the species capable of long-distance dispersal? Is it known to do so?	<i>If there are no conspecific populations in neighbouring regions or propagules are not able to disperse to the region, the regional population behaves as an endemic and the category should be left unchanged.</i>
<b>Evidence for the existence of local adaptations</b> Are there any known differences in local adaptation between regional and extra-regional populations, i.e. is it probable that individuals from extra-regional populations are adapted to survive within the region?	<i>If it is unlikely that individuals from extra-regional populations would be able to survive within the region, the category should be left unchanged.</i>
<b>Availability of suitable habitat</b> Are current conditions of habitats and/or other environmental (including climatological) requirements of the taxon in the region such that immigrating propagules are able to successfully establish themselves (i.e. are there inhabitable patches), or has the taxon disappeared from the region because conditions were not favourable?	<i>If there is not enough suitable habitat and current conservation measures are not leading to an improvement of the habitat within a foreseeable future, immigration from outside the region will not decrease extinction risk and the category should be left unchanged.</i>
<b>Status of extra-regional populations</b> How abundant is the taxon in neighbouring regions? Are the populations there stable, increasing or decreasing? Are there any important threats to those populations? Is it probable that they produce an appreciable amount of emigrants, and will continue to do so for the foreseeable future?	<i>If the taxon is more or less common outside the region and there are no signs of population decline and the taxon is capable of dispersing to the region and there is (or soon will be) available habitat, downgrading the category is appropriate. If the taxon is currently decreasing in neighbouring regions, the 'rescue effect' is less likely to occur, hence downgrading the category may not be appropriate.</i>
<b>Degree of dependence on extra-regional sources</b> Are extant regional populations self-sustaining (i.e. have they shown a positive reproductive rate over the years) or are they dependent on immigration for long-term survival (i.e. are the regional populations sinks)?	<i>If there is evidence that a substantial number of propagules regularly reach the region and the population still has a poor survival, the regional population may be a sink. If so, and there are indications that the immigration will soon cease, upgrading the category may be appropriate.</i>

(VU) or from VU to *Lower Risk Near Threatened* (LRnt). For expanding populations, whose global range barely touches the edge of the region, a downgrading of the category by two or more steps may be necessary. Conversely, if the population within the region is a demographic sink (Pulliam 1988) unable to sustain itself without migration from populations outside the region and the extra-regional source is expected to decrease, the extinction risk of the regional population may be underestimated by the criteria. In such exceptional cases an upgrading may be appropriate. If it is unknown whether extra-regional populations influence the extinction risk of the regional population, the precautionary principle should be exercised and the category met by the global criteria

should be kept unaltered.

Adjustments can be made to all the Red List Categories except for *Extinct* (EX), *Data Deficient* (DD), and *Not Evaluated* (NE), which must be used according to the rules (IUCN 1994). *EW* will in most cases be replaced by *RE*, following the section entitled *The Categories* above. The category *RE* should not be downgraded even if there are conspecific populations outside the region that may be the source of later recolonization.

#### *Priorities for Conservation*

Assessment of extinction risk and setting conservation priorities are two related but different processes. The assessment of ex-

tinction risk (such as the assignment of IUCN Red List Categories) generally precedes priority setting. The purpose of risk assessment is to produce a quantitative estimate of the likelihood of extinction of the taxon. Setting conservation priorities on the other hand often considers extinction risk, but also takes into account many other factors, such as availability of funds or personnel to carry out conservation actions, legal frameworks for conservation of threatened species, or ecological, phylogenetic, historical and cultural preferences for some species over others. In the context of regional risk assessments, there are a number of additional pieces of information that would be valuable for setting conservation priorities. For example, it is important not only to consider conditions

**Table 2. Hypothetical Regional Red List showing an example of the potential layout and information to be included.**

Taxon name	Regional Red List Category	Global Red List Category	Proportion of Global Population	Documentation and notes
<i>Aus australis</i> (Linnaeus, 1759)	VU A1b	LRlc	II	Andersen (1996) measured a 60% decline in traps since 1985 in southern subpop. Pop. still numerous close to the border: Downgraded from EN.
<i>Bus borealis</i> (Smith, 1954)	LRnt	NE	III	Population estimated at 10-20,000 indiv. and habitat probably decreasing. International distribution poorly known.
<i>Cus communis</i> (Alvarez, 1814)	EN A2c, B1+2c	DD	?	AOO estimated to 200 km <sup>2</sup> . The forests currently under high pressure.
<i>Dus domesticus</i> (Liu, 1988)	VU A1b	LRlc	IV	Visitor. Young stages (estimated 30% of world pop.) spend summer months in Blue Bay (Fisheries Dep. 1983). Visiting population has decreased by =20% the last 10 yr.
<i>Eus ephemericus</i> (Szymczak, 1904)	CR C2a, D	VU A1c,e	I	Not seen for last 10 yr. but believed to survive with a small no. of scattered indiv. (Lilliput County board <i>in lit.</i> )
<i>Fus frugivorus</i> (von Schultz, 1805)	VU A2e	LRnt	II	Still numerous and widespread but fungal disease has struck pop. in neighbouring country (Victor 1997). High prob. that the disease will reach our country.

within the region, but also to consider the status of the taxon in a global perspective. This is particularly important in small regions and land-bound countries. Consequently, it is recommended that any publication that results from a regional assessment should include at least three variables: (i) the regional Red List Category, (ii) the global Red List Category and (iii) the proportion of the global population occurring within the region.

The global Red List Category follows the published IUCN Red Lists (currently, Baillie and Groombridge 1996, Walter and Gillett 1998, and Oldfield *et al.* 1998). If a globally red-listed taxon is endemic to the region and the regional assessors come to a different conclusion about the category than the global assessors, the appropriate Red List Authority should be contacted and the status of the taxon re-examined (the exact procedures for this will be announced by SSC in due course). If agreement is reached to change the global assessment, the new global category may be given in the regional Red List even if it will be published before the next update of the global IUCN Red List is due (the latter will be updated annually from 1999). If no agreement is reached, the parties may submit an appeal based on the Red List Criteria for

judgement by the SSC *Red List Programme Standards Working Group*. In both cases, the issues must be documented under the listing for the taxon concerned.

The construction of the global criteria, particularly Criterion A, may in some circumstances lead to cases where a taxon meets the criteria for being red-listed at the global, but not the regional level. Such taxa should be included in the regional Red List, and their regional category denoted as *LRlc*.

The proportion of the global population should be denoted in one of three–five classes (Class I indicating the lowest proportion, III or V the highest). The proportion of total population size may, in the absence of good information, be estimated from known or estimated geographical distribution and/or suitable habitat. The delimitation of the classes will depend on the size of the region (i.e. how large a proportion of the global population of the taxon tend to occur within the region); and the width of classes need not to be identical. An even distribution of number of species assigned to the classes should be aimed at in order to achieve a good resolution of the data. An uncertain classification may be followed by a question mark, e.g. “II?”. If the proportion of the global population is

totally unknown, a question mark “?” should be used. The taxonomic classification level of the taxon, e.g. whether an entire species or a single subspecies (with a more restricted distribution) is considered, will influence the share occurring within a region. The percentages used to delimit the classes must be clearly stated in the regional Red List.

It is left to the regional authorities to judge how the three variables mentioned above (including the different taxonomic levels) should be accounted for in setting conservation priorities. Likewise, as mentioned above, the authorities may want to consider other variables in setting priorities. Such considerations are to a large degree region-specific, therefore they are not covered by the Guidelines.

#### *Documentation and Publication*

To facilitate the exchange of information between assessors in different regions and between regional and taxonomic Red List Authorities, it is recommended that all regional (and global) assessment exercises document their assessments in a specified way. The global documentation standards will be published by SSC in due course, but for the interim here are some guidelines for



regional lists:

- An assessment must specify, e.g. in introductory sections in the published Red List, which taxa (organism groups) have been evaluated against the Red List Criteria. This should indicate whether every taxon, or just a fraction of the respective groups have been assessed.
- The scientific names in the Red List should be followed by the author and year of description. Wherever possible, the nomenclature in standard global lists should be followed. Any deviations should be noted and justified. If no standards are available, the taxonomic reference/s used should be cited in full. Synonyms may be given if relevant to the assessment.
- The Red List Categories followed by the criteria and sub-criteria met should be indicated using the English abbreviated forms, even if the Red List is published in a national language other than English.
- Visiting taxa that meet any of the categories LRnt, LRcd, VU, EN, CR, RE, EW, EX or DD, should preferably be listed in a separate section, but if they are included in a list among reproducing taxa, the documentation for the taxa should clearly indicate that they are visitors.
- The rationale (including any assumptions, inferences and projections) and all data used (including e.g. demographic,

distributional, habitat, threat and conservation measures information if appropriate), for applying the criteria should be concisely documented under each taxon. This documentation would also include information about any uncertainties. The reasons for any change in status should also be noted in the documentation, and any downgrading or upgrading clearly indicated.

- All sources of information should be cited in full. If no sources are cited in the documentation, all statements will be attributed to the named assessor/s.
- The names and contact information for all those responsible for assessments should be specified. Similarly, two evaluators appointed by the Red List Authorities to evaluate each assessment should also be named.

A printed regional Red List is recommended to contain at least the columns presented in Table 2.

In addition to a printed Red List, which is normally written in the national language(s), publication on the World Wide Web in English (and the national language) is recommended. The web version could include more extensive documentation, as outlined above, than can be included in printed versions as seen in the example above. Web versions may also include the extensive listing and documen-

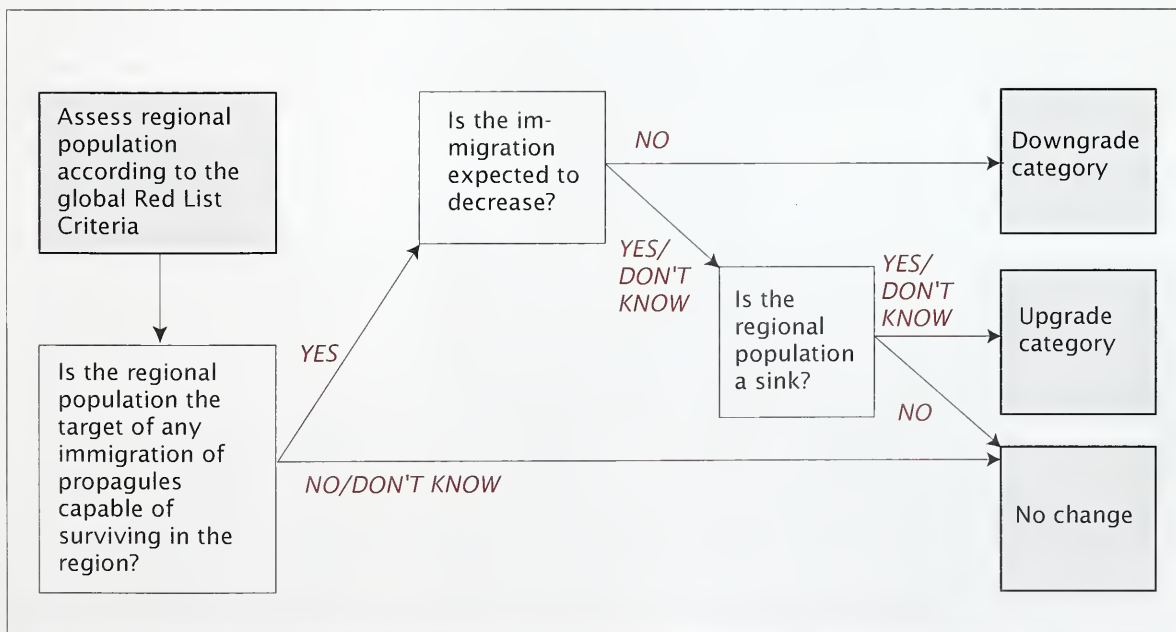
tation of taxa assessed as *LRlc*. A publication on the web may become a particularly important tool in the process of transferring information from the regional to the global scale.

## Discussion

### *New Criteria are Needed at Regional Level?*

In discussions with people responsible for the preparation of national Red Lists, we have often heard that “it is necessary to change the criteria and thresholds for the IUCN Red List Categories when working at a national level”. Two arguments are given for this opinion: “If we use the IUCN criteria, almost every species will enter the national Red List in a small country, and we do not have enough data for applying the detailed criteria from our country.”

The first argument is partly a misconception and the result of confusion about geographical scale (i.e. area) and problems with divided populations (e.g. by national borders), or confusion of assessing extinction risk (that Red Lists should express) with determining conservation priority (that normally includes additional variables). A general change in thresholds for smaller regions, e.g. higher population numbers and larger areas, and a decrease in population decline values, would lead to an



**Figure 2.** Conceptual scheme of the procedure for assigning an IUCN Red List Category at the regional level. The procedure for assigning the Regionally Extinct category is not included here. See Table 1 for further details on the procedure to be followed, especially in the second step.

underestimation of extinction risk. The only appropriate way therefore is to make a taxon by taxon assessment based on the global criteria and considering whether the respective population is isolated (i.e. behaves as an endemic taxon) or is merely a part of a larger population. The smaller the region, the more common it will be that their populations will be shared with neighbouring countries, requiring an adjustment of the Red List category. The problem may, however, not be as large as first conceived because putative red-listed taxa very often do have a fragmented distribution (reducing interaction between subpopulations) due to habitat destruction. Problems will arise mostly in the cases of highly mobile organisms, such as birds, large mammals, some insects, marine organisms with pelagic stages, and certain lower plants with highly mobile spores. Despite this, one would still expect a higher *percentage* of the taxa occurring in smaller countries to be red-listed. This is because smaller countries have on average smaller populations (fewer locations) and the probability of extinction is generally higher in smaller populations. The second argument, that there is not enough data at the regional level, is generally self-contradictory. It is true, many countries do lack data on distribution, population numbers and trends for their taxa. However, the IUCN Red List Criteria have been successfully applied at the global level (the most data poor of all scales) to over 15,000 taxa (Baillie and Groombridge 1996, Oldfield *et al.* 1998). Most assessors also find that after gaining some experience in applying the criteria, that they can readily be used with a very limited amount of hard data.

### *Objectivity and Conceptual Difficulties on Regional Levels*

The IUCN Categories and Criteria (IUCN 1994) were developed to enhance the objectivity and comparability of Red Lists (Mace and Lande 1991, Mace and Collar 1994, Baillie and Groombridge 1996). Will these Regional Application Guidelines and their recommended two-step procedure (with a possibility to adjust the category first met) result in a less objective categorisation? We think the contrary is true. The assessment in both steps (using the IUCN Red List Criteria and the adjustment procedure) includes subjective evaluations of available data, but both steps have well-defined frames, against which the assessment process is conducted.

At a regional level, the time frame consid-

ered in the risk assessment is more important than at the global level (Gärdenfors 1995, 1996). For instance, a regional extinction may be followed by a later recolonization. Also, at a regional level, a taxon may for example be *EN* according to Criterion E on a 20 yr. time scale (IUCN 1994), while the long-term extinction risk may in fact be less than 50% due to the rescue effects of neighbouring populations (Hanski 1991, Hanski and Gyllenberg 1993). Although the time scale is conceptually important for particular definitions (e.g. Criterion E and the category *RE*), we have largely ignored this issue in the proposed Guidelines. Instead, we have tried to adopt a pragmatic approach, and address, for example, the rescue effect, by suggesting a downgrading of the category. We believe that the resultant problems are more of a conceptual nature than real. In most cases, regional populations disappear because of habitat destruction and no immigrating propagules will rescue the population, or lead to any recolonization.

There is one inconsistency to the downgrading approach suggested in the Guidelines: A downgrading from *RE* to *CR* (or upgrading from *CR* to *RE*) is not recommended. It would be difficult to communicate to the general public that a taxon that no longer occurs in the country is categorised as *CR* or that a still extant species is *RE*.

We have proposed the term *Regionally Extinct*, rather than Extirpated or Vanished, as currently used in some countries. Extirpate literally means a successful eradication conducted on purpose, and that is very rarely the case when a species goes extinct. Also, an abbreviation of Extirpated could easily be confused with *EX*.

### *Scale of International Comparison*

In widely distributed species, there may be marked genetic variation over the range, making an account for the global share within a region less meaningful. Consequently, it could be argued that the continental or a comparable biogeographical scale, would be the most appropriate for comparison, both regarding population proportion and risk of extinction (Gärdenfors 1996). But we have chosen to recommend the global level as the first option, because that geographical scale is always unambiguous and there are few Red Lists available which encompass whole continents (apart from those for Australia and North America). Besides, in the majority

of taxa, the total distribution is restricted to one continent, making little difference to which scale is chosen. However, nothing precludes a region from giving the population share and Red List Category at both the global and continental levels in their Red List.

### Acknowledgements

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## APPENDIX 5

# The Application of IUCN Red List Criteria at Regional Levels

Ulf Gärdenfors,<sup>§</sup> Craig Hilton-Taylor,<sup>#</sup> Georgina M. Mace,<sup>\*</sup> & Jon Paul Rodríguez<sup>‡</sup>

<sup>§</sup>Swedish Threatened Species Unit, SLU, Box 7007, 750 07 Uppsala, Sweden, email Ulf.Gardenfors@dha.slu.se

<sup>#</sup> IUCN/SSC UK Office, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom, email redlist@ssc-uk.org or craig.hilton-taylor@ssc-uk.org

<sup>\*</sup>Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, United Kingdom, email Georgina.Mace@ioz.ac.uk

<sup>‡</sup>Centro de Ecología, Instituto Venezolano de Investigaciones Científicas (IVIC), Apartado 21827, Caracas 1020-A, Venezuela, email jonpaul@ivic.ve

### Abstract

In 1994, the World Conservation Union (IUCN) adopted new quantitative criteria for the classification of threatened animals and plants in the IUCN Red Lists (IUCN 1994). These Criteria were recently reviewed and some modifications introduced (IUCN 2001). The system, which may be applied to taxonomic units at the species level and below, is designed to reflect relative extinction risk based on information about population size, geographical distribution, known threats, and trends in these measures. The IUCN Red List Criteria have inspired several national and regional authorities to develop similar systems. Unfortunately, when the area is only a portion of a population's entire range, it is not always possible to apply the IUCN criteria, because the quantitative criteria when applied di-

rectly to regional populations may produce misleading results. Here we present some guidelines that have been developed to allow use of the IUCN system at a national and regional level in a way that is (1) complementary to the global listing process and (2) will lead to realistic assessments of extinction risk at the regional or national level. We propose a two-step process. First, the taxon is examined against the Criteria as if it were an isolated population, and a preliminary Red List Category is assigned. Second, interactions with populations in neighboring political jurisdictions are considered, and, the category can be adjusted as appropriate to account for the effect of these interactions. Once the Red List Category, which is directly related to extinction risk, has been determined, conservation priorities for these taxa can be established by the relevant national or regional

process. We recommend that (1) the IUCN Red List Category of the global population and the (2) proportion of the global population occurring within the region should be considered in the priority-setting process and that this information should be presented in the regional Red List.

**Keywords:** Extinction risk, conservation priority, national, migration, rescue effect

### Introduction

Red Lists and Red Data Books are among the most widely used tools available to conservationists worldwide for focusing attention on species of conservation concern. Prior to 1994, the threatened categories used in Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. In the late 1980s, The

World Conservation Union (IUCN), under the auspices of the Species Survival Commission (SSC), initiated a process for revising the IUCN Red List Categories. The aim of this revision was to improve the objectivity and repeatability of the assessment process, as well as to develop quantitative criteria that assigned species to categories on the basis of their relative extinction risk. In 1994, the IUCN Council adopted new Red List Categories and Criteria (IUCN 1994), which enabled the assessment of the extinction risk of species or lower taxonomic units at the global scale. The most recent version of the criteria can be found in IUCN (2001) or on the Internet, at <http://www.iucn.org/themes/ssc/redlists/RLcategories2000.html>, and are briefly outlined in Figure 1.

The IUCN Red List Criteria have inspired several national and regional authorities to develop similar systems. IUCN is keen to support and encourage regional (here used to include any sub-global level) listings. Such lists are often linked to actions at national levels and also provide the global listing and action processes with valuable information. Our goal to have mutual benefits between national/regional and global Red Lists will be more easily achieved with greater consistency in the application of the criteria (Rodríguez et al 2000; Hilton-Taylor et al 2000). Here, we present some guidelines to improve both consistency and the validity of sub-global assessments.

Provided the regional population to be assessed is isolated from conspecific populations outside the region, the (global) IUCN Red List Criteria (IUCN 2001) can be used without modification. The extinction risk of such an isolated population is identical to an endemic taxon, and in these situations, the criteria can be used with unaltered thresholds at any geographical scale. However, when the criteria are applied to part of a population defined by a geo-political border, or to a regional population occasionally interchanging individuals with other populations beyond the border, the thresholds listed under each criterion will be incorrect since the unit being assessed is not the same as the actual population. As a result the estimate of extinction risk will be inaccurate.

Within any region, there will be taxa with different distribution histories, ranging from those that are indigenous (native to the area) since pre-human settlement to those recently introduced by people. There may also be breeding and non-breeding

taxa. The latter are those that do not reproduce in the region but still utilize (and may be dependent upon) its resources. There may also be formerly native taxa that are now extinct in the region but which are still extant in other parts of the world (Gärdenfors 1995; 1996). Here we present proposals for consistent listings of all these situations.

A first attempt to resolve these issues was made by the Regional Application Working Group (RAWG), formed under the SSC Red list Programme Subcommittee (Gärdenfors et al. 1999). Since then we have received many comments and suggestions and have also tested the principles in a number of real situations (Gärdenfors 2001). The draft that follows incorporates many amendments and we are seeking further comments and suggestions. A final revision of the guidelines will be tested at regional workshops and then recommended for adoption by the IUCN Species Survival Commission during 2002.

## Definitions

### Benign Introduction

An attempt to establish a taxon, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a taxon's historic range (from IUCN 1998).

### Conspecific Populations

Populations of the same species, here applied to any taxonomic unit at or below the species level.

### Current Range

The present geographical distribution of the taxon.

### Downgrading and Upgrading

The process for adjusting the Red List Category of a regional population according to a decreased or increased risk of extinction. Downgrading refers to a reduced extinction risk and upgrading to an increased extinction risk.

### Endemic Taxon

A taxon is endemic to an area if it is naturally found only there and nowhere else. It is a relative term. A taxon can be endemic to a small island, to a country or to a continent.

### Global Population

The total number of individuals of the

taxon. See *Population*.

### Natural Range

The range of a taxon, *excluding* any portion that is the result of introduction to the region or a neighboring region after the year 1800. Taxa introduced before 1800 should also have developed local adaptations to be regarded as being within their natural range. The natural range includes areas where the taxon does not breed but regularly utilizes resources, such as feeding grounds or watering sites during migration and other areas occupied during nonbreeding periods.

### Population

The term *Population* is used in a specific sense in the IUCN Red List Criteria (IUCN 2001) that is different to its common biological usage. Thus, *Population* is defined as the total number of individuals of the taxon. Within the context of a Regional Assessment, however, it may be advisable to use under the same definition, the term *Global Population* rather than *Population*. In these Regional Guidelines we use the term *population*, for convenience, when general reference is made to a group of individuals of a given taxon that may or may not interchange propagules with other such entities. See *Regional population* and *Subpopulation*.

### Propagule

Any live entity capable of dispersal and of producing a new mature individual, e.g., a spore, seed, fruit, egg, larva, part of or entire individual.

### Region

Any sub-global geographical area, such as continent, country, state or province.

### Regional Assessment

The process for assessing the relative extinction risk of a regional population according to the guidelines given here.

### Regionally Extinct (RE)

A taxon is *Regionally Extinct* when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, if a former visiting taxon, the last individual has died or disappeared from the region.

### Regional Population

The portion of the global population within the area being studied. This may comprise one or more subpopulations.



### Rescue Effect

The process by which immigrating propagules result in a lower extinction risk of the target population.

### Subpopulation

*Subpopulations* are defined (IUCN 2001) as geographically or otherwise distinct groups in the (global) population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less). A subpopulation may or may not be restricted to a Region.

### Taxon

Any species or infra-specific taxon whose extinction risk is being assessed.

### Vagrant

A taxon that currently is found only very occasionally within the boundaries of the region. The region would therefore only have a very small share of the global population. See *Visitor*.

### Visitor = Visiting Taxon

A taxon that does not reproduce within the region but regularly occurs within its boundaries either now or during some period of the last century. Visitors are distinguished from *vagrants* (see above) by a pre-set limit on the proportion (current or during any considerable period of the last cen-

tury) of the global population involved. The limit is decided by those responsible for the regional Red List process.

### Wild Population

A population within its natural range where the individuals are the result of natural reproduction, i.e., not the result of human-mediated release or translocation. If a population is the result of a benign introduction that is now, or has previously been successful (i.e. selfsustaining), the population is considered to be wild.

### The Assessment

#### Taxa to be Assessed

The categorisation process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (IUCN 2001). Taxa only marginally within the region should also enter the assessment process. However, a taxon that occasionally breeds under favorable circumstances in the region but then regularly becomes (regionally) extinct should not be considered because it is not within its' natural range following our definitions. Similarly, a taxon that is currently expanding its distributional range outside the region and appears to be in a colonization phase within the region should not be considered for regional assessment until the taxon has re-

produced within the region for several years (typically at least for 10 consecutive years or three generations, whichever is the longer).

Visiting taxa, i.e., taxa not reproducing within the region but regularly visiting the area as migrants or wintering/summering populations, may be assessed against the Criteria. Vagrant taxa should, however, not be assessed.

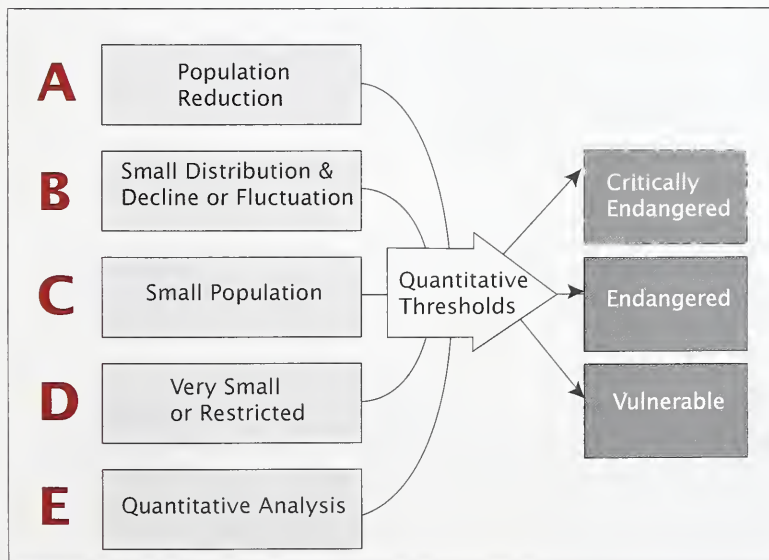
### The Categories

The IUCN Red List Categories (IUCN 2001) should be used unaltered at regional levels, with three exceptions or adjustments:

1. Taxa extinct within the region but extant in other parts of the world should be classified as *Regionally Extinct (RE)*. A taxon is *RE* when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, if considering a former visiting taxon, if individuals no longer visit the region.

Populations of long-lived individuals that have ceased to reproduce within the region (for example as a result of a deteriorating environment) should be regarded as potentially capable of reproduction and, consequently, not be classified as *RE*. The rationale behind this is that the environment may improve leading to a resumption of reproduction by the remaining individuals. On the other hand, vagrant individuals of a formerly regionally breeding taxon that reach the Region should not be regarded as potentially capable of reproduction. The classification of visiting taxa as *RE* will be determined by the assessors using information from monitoring efforts devoted to the taxon within the region, the taxon's known status, and environmental conditions in its non-breeding as well as breeding areas.

2. The category *Extinct in the Wild (EW)* should be assigned only to taxa that are extinct in the wild over their entire natural range, including the region, but extant in cultivation, in captivity, or as a naturalized population (or populations) well outside the past range. If a taxon is (globally) *EW* but extant in a naturalized population within the region, the regional population should be viewed as the result of a benign introduction and, consequently, assessed according to the Red List Criteria.



**Figure 1. Summary outline of the IUCN Red List Criteria (A-E) for the categories Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) according to IUCN (2001). For determining these categories, at least one should be met for assigning a species. The full system (see: <http://www.iucn.org/themes/ssc/redlists/RLcategories2000.html>) must be consulted for any application, since it is more complex with subcriteria and numerical thresholds not included here.**

3. The category *Not Evaluated* (NE) will be assigned to two kinds of taxa: (i) Those that have not yet been evaluated, e.g., due to lack of personnel or monetary resources (this is the general definition of NE at the global level). (ii) Those (mainly introduced taxa and vagrants) that are not eligible for assessment at a regional level and, consequently, have not been evaluated.

### The Assessment Procedure

The regional assessment should be carried out in a two-step process (Fig. 2 and Table 1). In the first step the global IUCN Red List Criteria are applied to the regional population of the taxon (as specified by IUCN 2001), resulting in a preliminary categorisation. All data used in this initial assessment (e.g. number of individuals and variables relating to area, reduction, decline, fluctuations, subpopulations, locations, fragmentation, etc.) should be from the regional population, not the global population. In the second step, the existence and status of any conspecific populations outside the region that may affect the risk of extinction within the region should be investigated. If the taxon is endemic to the region or the regional population is isolated, the Red List Category defined by the Criteria should be adopted unaltered. If, on the other hand, there are conspecific populations outside the region that are judged to affect the regional extinction risk, the regional Red List Category should be changed to a more appropriate level, to reflect the extinction risk as defined by Criterion E (see Fig. 1). In most cases, this will mean downgrading the category met by the

global Criteria, since populations within the region may experience a 'rescue effect' from populations outside the region (Brown & Kodric-Brown 1977; Hanski & Gyllenberg 1993). In other words, immigration from outside the region will tend to decrease extinction risk within the region. Normally, such a downgrading will involve a one step change in category, e.g., moving the category from *Endangered* (EN) to *Vulnerable* (VU), or from VU to *Near Threatened* (NT). For expanding populations, whose global range barely touches the edge of the region, a downgrading of the category by two or even more steps may be appropriate. Conversely, if the population within the region is a demographic sink (Pulliam 1988) unable to sustain itself without migration from populations outside the region and the extra-regional source is expected to decrease, the extinction risk of the regional population may be underestimated by the criteria. In such exceptional cases an upgrading of the category may be appropriate. If it is unknown whether extra-regional populations influence the extinction risk of the regional population, the global criteria should be kept unaltered.

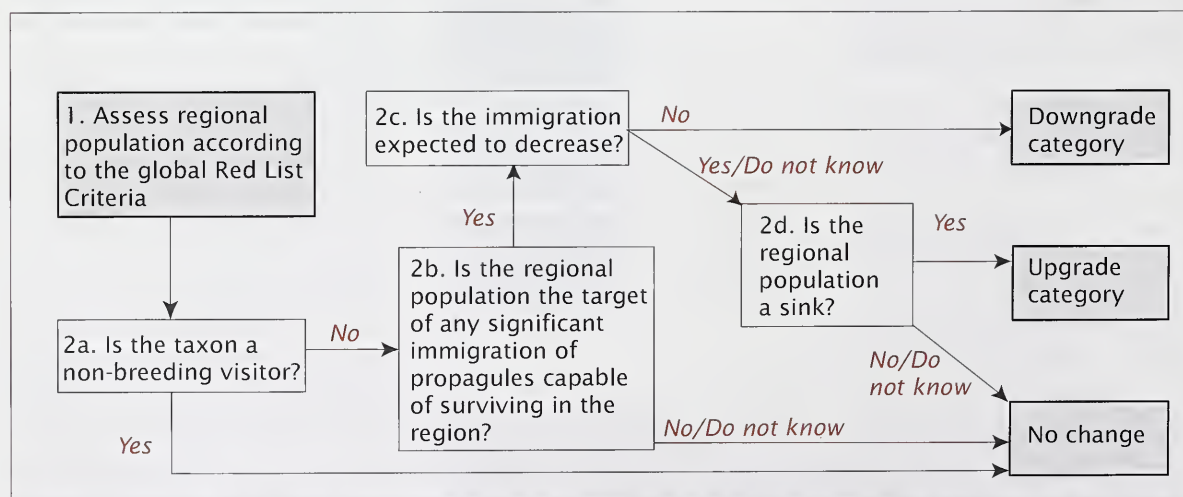
Adjustments can be made to all the Red List Categories except for *Extinct* (EX), *Extinct in the Wild* (EW), *Regionally Extinct* (RE), *Data Deficient* (DD), and *Not Evaluated* (NE), which cannot be up- or downgraded.

Visiting taxa may be assessed against the IUCN Red List Criteria. Note the distinction between a visitor and a vagrant, since the latter cannot be assessed. The lower

limit in global population share for being defined as a visitor should be decided by the regional authority, but will normally be within the interval of 5–15%. All data used in the assessment, such as population size and the area of occupancy in the target region, should pertain to the visiting individuals only. However, it may be essential to examine the conditions in the breeding area to be able to interpret the nature of changes in area used by visitors. For instance, a projected or suspected population size reduction (criterion A3 or A4) may be based not only on changing conditions in the area used by visitors but also in the breeding area. It is also essential to distinguish true population changes and fluctuations from transient changes, which may be due to unsuitable weather or other factors, resulting in visitors temporarily favoring other regions. The extent of occurrence, as well as the area of occupancy, may change considerably from year to year. It is then appropriate to use a lower estimate, which will in most cases be closer to the mean than the lowest recorded estimate.

### Priorities for Conservation

Assessment of extinction risk and setting conservation priorities are two related but different processes. The assessment of extinction risk (such as the assignment of IUCN Red List Categories) generally precedes priority setting. The purpose of the Red List categorisation is to produce a relative estimate of the likelihood of extinction of the taxon. Setting conservation priorities, on the other hand, often considers ex-



**Figure 2.** Conceptual scheme of the procedure for assigning an IUCN Red List Category at a regional level. In step number 1 all data used should be from the regional population, not the global population. The procedure for assigning the *Regionally Extinct* category is not included here. See Table 1 for further details on the procedure to be followed, especially in the second step.



tion risk, but also takes into account many other factors, such as availability of funds or personnel to carry out conservation actions, legal frameworks for conservation of threatened taxa, or ecological, phylogenetic, historical, and cultural preferences for some taxa over others. In the context of regional risk assessments, there are a number of additional pieces of information that would be valuable for setting conservation priorities. For example, it is important not only to consider conditions within the region, but also to consider the status of the taxon in a global perspective. This is particularly important in small regions and mid-continental countries. Consequently, it is recommended that any publication that results from a regional assessment should include at least three meas-

ures: (i) the regional Red List Category, (ii) the global Red List Category and (iii) an estimate of the proportion (%) of the global population occurring within the region. If the proportion of the global population is totally unknown, a question mark '?' should be used. The taxonomic classification level of the taxon, e.g., whether an entire species or a single subspecies (with a more restricted distribution) is considered, will influence the share occurring within a region.

It is left to the regional authorities to judge how the three variables (i-iii), as well as different taxonomic levels, should be used when setting conservation priorities. Likewise, as mentioned above, the authorities may wish to consider other variables in set-

ting priorities. Such considerations are to a large degree region-specific; therefore they are not covered by the Guidelines.

## Documentation and Publication

To facilitate the exchange of information between assessors in different regions and between regional and taxonomic Red List Authorities, it is recommended that all regional (and global) assessment exercises document their assessments in a specified way. The global documentation standards (IUCN 2001, Annex 2-3) should be followed.

The introductory sections should include a list of the taxonomic groups that have been evaluated against the Red List Criteria.

**Table 1. To judge whether any extra-regional populations may affect the extinction risk of the regional population, the checklist in the table below should be considered. Compare Figure 2.**

Questions	Comments
<b>2a. Is the taxon a non-breeding visitor?</b> Is the taxon reproducing within the region or is it merely a visitor utilizing resources within the region?	<i>If the answer to the headline question is both yes and no, i.e., there are two distinct subpopulations with one being a non-reproducing migrant and the other being a reproducing subpopulation, then each subpopulation should be treated as different taxa and be assessed separately.</i>
<b>2b. Likelihood of propagule migration</b> Are there any conspecific populations outside the region within a distance from which propagules could reach the region? Is the regional population part of a larger metapopulation involving extra-regional patches? Are there any effective barriers preventing dispersal to and from neighbouring populations? Is the taxon capable of long-distance dispersal? Is it known to do so?	<i>If there are no conspecific populations in neighboring regions or propagules are not able to disperse to the region, the regional population behaves as an endemic and the category should be left unchanged.</i>
<b>2b. Evidence for the existence of local adaptations</b> Are there any known differences reflecting local adaptations between regional and extra-regional populations, i.e., is it probable that individuals from extra-regional populations are adapted to survive within the region?	<i>If it is unlikely that individuals from extra-regional populations would be able to survive within the region, the category should be left unchanged.</i>
<b>2b. Availability of suitable habitat</b> Are current conditions of habitats and/or other environmental (including climatological) requirements of the taxon in the region such that immigrating propagules are able to successfully establish themselves (i.e. are there habitable patches?), or has the taxon disappeared from the region because conditions were not favourable?	<i>If there is not enough suitable habitat and current conservation measures are not leading to an improvement of the habitat within a foreseeable future, immigration from outside the region will not decrease extinction risk and the category should be left unchanged.</i>
<b>2c. Status of extra-regional populations</b> How abundant is the taxon in neighboring regions? Are the populations there stable, increasing or decreasing? Are there any important threats to those populations? Is it probable that they produce an appreciable amount of emigrants, and will continue to do so for the foreseeable future?	<i>If the taxon is more or less common outside the region and there are no signs of population decline and the taxon is capable of dispersing to the region and there is (or soon will be) available habitat, downgrading the category is appropriate. If the taxon is currently decreasing in neighbouring regions, the 'rescue effect' is less likely to occur hence downgrading the category may not be appropriate.</i>
<b>2d. Degree of dependence on extra-regional sources</b> Are extant regional populations self-sustaining (i.e. have they shown a positive reproductive rate over the years) or are they dependent on immigration for longterm survival (i.e. are the regional populations sinks)?	<i>If there is evidence that a substantial number of propagules regularly reach the region and the population still has a poor survival, the regional population may be a sink. If so, and there are indications that the immigration will soon cease, upgrading the category may be appropriate.</i>

A printed regional Red List should present at least the scientific name and the authorship of the taxon, the regional Red List Category (using the English abbreviated forms) and Criteria, the global IUCN Red List Category and Criteria, and the proportion (%) of the global population occurring within the region. If possible, the vernacular name (in the national language) and a short summary of the documentation of the taxon should also be included. Visiting taxa that meet any of the categories *NT*, *VU*, *EN*, *CR*, *RE*, *EW*, *EX* or *DD* should preferably be listed in a separate section, but if they are included in a list of breeding taxa, it should clearly indicate that they are visitors.

The global Red List Category should follow published IUCN Red Lists (currently, Hilton-Taylor 2000 and Walter & Gillett 1998). If a globally red-listed taxon is endemic to the region and the regional assessors have come to a different conclusion about the category than the global assessors (e.g., see Rodriguez *et al.* 2000; Hilton-Taylor *et al.* 2000), the IUCN Red List Office (redlist@ssc-uk.org) should be contacted with a request that the status of the taxon be re-examined by the designated Red List Authority. (i) If agreement is reached to change the global assessment, the new global category may be given in the regional Red List even if it will be published before the next update of the global IUCN Red List (the latter will be updated annually from 2002). (ii) If no agreement is reached, the regional authority may submit an appeal based on the IUCN Red List Criteria for judgment by the SSC *Red List Programme Standards and Petitions Subcommittee*. (iii) If no conclusion is reached before the finalization of the regional Red List, the category according to the regional assessment may be used as the regional category, and the IUCN global Red List category should be used in the global category position. In all three cases, the issues must be documented under the listing for the taxon concerned.

The application of the global criteria, particularly Criterion A, may under some circumstances lead to the situation where a taxon qualifies for listing at the global, but not the regional level. This may be the case when the regional population is stable but constitutes only a small percentage of the global population, which is experiencing a net decline. Such taxa should be included (in the main list or in an annex) in the regional Red List and their regional category denoted as *LC*.

In addition to a printed Red List, which is normally written in the national language(s), publication on the Internet in English (and the national language) is recommended. The web version could include the full documentation (according to IUCN 2001, Annex 3), which could be difficult in the printed version (unless published as a full Red Data Book). A Web version may also include the extensive listing and documentation of taxa assessed as *LC*. A publication on the web may be a particularly important tool in the process of transferring information from the regional to the global scale (Rodriguez *et al.* 2000).

## Discussion

### *New Criteria at Regional Level?*

In discussions with those responsible for the preparation of national Red Lists, we have often heard that 'the criteria and the thresholds for the IUCN Red List Categories should be changed for application at a national level'. Two justifications are given for this opinion: 'If we use the IUCN criteria, almost every species will enter the national Red List in a small country' and, 'we do not have enough data for applying the detailed criteria from our country'.

The first justification is partly due to a confusion between the effect of geographical scale (extinction risk is correlated to the size of the population but not to the size of the country) and issues arising from national borders dividing a population. National boundaries are often irrelevant for populations so a taxon inhabiting a small country does not have a high extinction risk when the global population is considered (not just the fragment of the population which occurs in the country in question). This view also results from confusing the assessment of extinction risk (the role of Red Lists) with the setting of conservation priorities (normally including consideration of additional variables such as political or social factors).

A general change in thresholds for smaller regions, e.g., higher population numbers and smaller areas, and a decrease in population decline values, would lead to an underestimation of extinction risk. Therefore the appropriate method is to make a taxon-by-taxon assessment based on the global IUCN Red List Criteria and then consider whether the population is isolated (i.e. behaves as an endemic taxon) or is part of a larger population. The smaller the region, the more common it will be that

populations are shared with neighboring countries, and hence designation of a Red List category will require consideration of the population as a whole. The problem may, however, not be as serious as it first appears because putative red-listed taxa very often do have a fragmented distribution (reducing interaction between subpopulations) due to habitat destruction. Hence, a well defined subpopulation may often exist within a single country.

Problems will arise mostly in the cases of highly mobile organisms, such as birds, large mammals, some insects, marine organisms with pelagic stages, and certain lower plants with highly mobile spores. Despite this, one would still expect a higher percentage of the taxa occurring in smaller countries to be red-listed. This is because smaller countries have on average smaller populations (fewer locations) and the probability of local extinction is generally higher in smaller populations.

The second statement, that there is not enough data at the regional level, is generally not a significant issue. It is true that many countries do lack precise data on distribution, population numbers and trends for their taxa. However, the criteria do not require precise information – generally the assessor simply has to determine whether the value lies above or below some threshold levels. In fact, the IUCN Red List Criteria have been successfully applied at the global level (the most data poor of all scales) to over 15,000 taxa (Hilton-Taylor 2000). Most assessors also find that after gaining some experience in applying the criteria, they can readily be used with a quite limited amount of precise information.

### *Visiting Taxa*

The quality of the habitat in areas occupied during non-breeding periods may be essential for the survival of a species. Consequently, we think that it is important to include assessments of visiting species in national and regional Red List assessments. However, this has rarely been attempted in the past and so there is little relevant experience. The IUCN Red List Criteria were developed to produce a categorisation correlated to risk of extinction. Whether the same criteria can be used for a non-reproducing phase of a population still remains to be thoroughly tested and evaluated. This includes evaluation and conceptual work on whether there are situations when it would be appropriate to apply the adjusting step for visiting populations.



## Objectivity and Conceptual Difficulties on Regional Levels

The IUCN Red List Categories and Criteria (IUCN 1994; 2001) were developed to enhance the objectivity and comparability of Red Lists (Mace & Lande 1991; Mace & Collar 1994; Baillie & Groombridge 1996). Will these Regional Application Guidelines and the recommended two-step procedure still result in an objective categorisation? We believe so. The assessment in both steps (using the IUCN Red List Criteria and the adjustment procedure) includes subjective evaluations of available data, but both steps have welldefined frames, against which the assessment process is conducted.

The time frame considered in the risk assessment is more important at regional than global level (Gärdenfors 1995; 1996). For instance, a regional extinction may be followed by a later recolonization. This effect will be even more pronounced for visiting taxa. Also, at a regional level, a taxon may be *EN* according to Criterion E on a 20 year time scale (IUCN 2001), while the long-term extinction risk may be less due to the rescue effects of neighboring populations. Although the time scale is conceptually important for particular definitions (e.g. Criterion E and the category *RE*), we have largely ignored this issue in the proposed Guidelines. Instead, we have tried to adopt a pragmatic approach, and address, for example, the rescue effect, by suggesting a downgrading of the category. We believe that any resulting difficulties are more of a conceptual nature than real. In most cases, regional populations disappear because of habitat destruction and no immigrating propagules will rescue the population, or lead to any recolonization.

We have proposed the term *Regionally Extinct*, rather than Extirpated or Vanished, as currently used in some countries. Extirpation literally means a successful eradication conducted on purpose, and that is hardly ever the cause of an extinction. Also, an abbreviation of Extirpated could easily be confused with *EX*. Besides *RE*, some people have requested a category like 'Regionally Extinct in the Wild'. We believe that this would not be very informative since *RE* already implies that the taxon is extant elsewhere in the world. The creation of yet another category could create more complexity to the system. Indeed, the comparative complexity already encompassed in the system makes it a challenge to communicate and explain it to persons compiling national and other regional Red Lists.

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Family names appear in capital letters; italics denote synonyms.

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*Moraea aristata*, South Africa.  
(Photo: NBI)



*Erica porteri*, South Africa.  
(Photo: NBI)



Zambezi Rapids, Zambia. (Photo: J. Burrows)



Landscape of Nyanga (World's View), Zimbabwe.  
(Photo: J. Timberlake)



*Daubenya aurantiaca* var. *coccinea*, South Africa.  
(Photo: NBI)



*Bauhinia natalensis*, South Africa. (Photo: NBI)

# About SABONET

This publication is a product of the Southern African Botanical Diversity Network (SABONET), a programme aimed at strengthening the level of botanical expertise, expanding and improving herbarium and botanic garden collections, and fostering closer collaborative links among botanists in the southern African subcontinent.

The main objective of SABONET is to develop a strong core of professional botanists, taxonomists, horticulturists, and plant diversity specialists within the ten countries of southern Africa (Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe). This core group will be competent to inventory, monitor, evaluate, and conserve the botanical diversity of the region in the face of specific development challenges, and to respond to the technical and scientific needs of the Convention on Biological Diversity.

To enhance the human resource capacity and infrastructure available in the region, SABONET offers training courses, workshops, and collaborative expeditions in under-collected areas. The programme produces a newsletter, *SABONET News*, and a series of occasional publications, the *Southern African Botanical Diversity Network Report Series*, of which this publication is part.

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For more information contact one of the following addresses:

## General enquiries about SABONET

SABONET Coordinator  
c/o National Botanical Institute  
Private Bag X101  
Pretoria 0001  
South Africa  
Tel: (27) 12 804 3200  
Fax: (27) 12 804 3211/5979  
E-mail: [info@sabonet.org](mailto:info@sabonet.org)  
<http://www.sabonet.org>

## ANGOLA

Luanda Herbarium  
(Prof. Esperança Costa)  
Universidade Agostinho Neto  
Rua Fernando Pessoa No. 103  
Villa Alice  
Caixa Postal 3244  
Tel: (244) 2 336 168  
Fax: (244) 2 336 168  
E-mail: [esperancacosta@yahoo.com](mailto:esperancacosta@yahoo.com)

## BOTSWANA

National Herbarium  
(Mr Nonofo Mosesane)  
Private Bag 00114  
Gaborone  
Tel: (267) 373860/374616  
Fax: (267) 311186/302797  
E-mail: [nmosesane@gov.bw](mailto:nmosesane@gov.bw)

## LESOTHO

National Environment Secretariat  
(Mr Thulo Qhotsokoane)  
Ministry of Environment  
Private Bag A23  
Maseru 100  
Tel: (266) 311 767  
Fax: (266) 310 506/321505  
E-mail: [tghotsokoane@ilesotho.com](mailto:tghotsokoane@ilesotho.com)

## MALAWI

National Herbarium and Botanic Gardens of  
Malawi  
(Dr Augustine Chikuni)  
P.O. Box 528  
Zomba  
Tel: (265) 525 388/118/145  
Fax: (265) 524164/108  
E-mail: [augustine@sdnp.org.mw](mailto:augustine@sdnp.org.mw)

## MOZAMBIQUE

LMA Herbarium (Mr MAC da Silva)  
Instituto Nacional de Investigação  
Agronómica  
Caixa Postal 3658  
Mavalane  
Maputo  
Tel: (258) 1 460 255/130/190/097  
Fax: (258) 1 460 074  
E-mail: [depbotan@zebra.uem.mz](mailto:depbotan@zebra.uem.mz)

## NAMIBIA

National Herbarium  
(Dr Gillian L Maggs-Kölling)  
National Botanical Research Institute  
Private Bag 13184  
Windhoek  
Tel: (264) 61 202 2020  
Fax: (264) 61 258 153  
E-mail: [gmk@mweb.com.na](mailto:gmk@mweb.com.na)

## SOUTH AFRICA

National Herbarium  
(Prof. Gideon Smith)  
National Botanical Institute  
Private Bag X101  
Pretoria 0001  
Tel: (27) 12 804 3200  
Fax: (27) 12 804 3211/5343  
E-mail: [gfs@nbipre.nbi.ac.za](mailto:gfs@nbipre.nbi.ac.za)

## SWAZILAND

National Herbarium  
(Mr Gideon Dlamini)  
Malkerns Agricultural Research Station  
P.O. Box 4  
Malkerns  
Tel: (268) 52 82111/83017/83038  
Fax: (268) 52 83360/83490  
E-mail: [sdnh@africaonline.co.sz](mailto:sdnh@africaonline.co.sz)

## ZAMBIA

Herbarium (Dr Patrick Phiri)  
Department of Biological Sciences  
University of Zambia  
P.O. Box 32379  
Lusaka  
Tel: (260) 1 293 158  
Fax: (260) 1 294806/253952  
E-mail: [Pphiri@natsci.unza.zm](mailto:Pphiri@natsci.unza.zm)

## ZIMBABWE

National Herbarium and Botanic Garden  
(Ms Nozipo Nobanda)  
Alexandra Park  
Avondale  
Harare  
Tel: (263) 4 708 938/744170/725313/745230  
Fax: (263) 4 728 317/708 938  
E-mail: [srgh@mweb.co.zw](mailto:srgh@mweb.co.zw)











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† Available in PDF format on the SABONET web site: <http://www.sabonet.org/publications/download.htm>

Species that are threatened with extinction mean different things to different people, and to some, it may have no significance whatsoever. In southern Africa, many people are likely to reflect on plant species losses in terms of what it represents to sustainable resource extraction and yield maximisation. Others see species loss in terms of population declines that bring about irreversible degeneration of species and their critical habitats, which in turn leads to an ecological snowball effect; there are others who associate species losses with collapsing formal and informal economies. Whether we regard threatened species in a socio-economic or scientific context, does not really matter. What does matter, is how we choose to deal with species in decline.

The *Southern African Plant Red Data Lists* presents plant Red Data Lists for ten southern African countries: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe. About 3,900 plant and tree species for this vast region are classified here into various categories of extinction risk according to internationally used principles laid down by the World Conservation Union (IUCN).

Measures for coping with species losses need to be dealt with at social, economic, and political levels. Until the notions of threatened plants and threatened ecosystems become firmly entrenched within developmental agendas, efforts at retaining species for economies and the benefit of future generations will yield little. To this end, the *Southern African Plant Red Data Lists* serves as both a technical and a political document—it offers a practical conservation dimension that can be integrated into more sustainable socio-economic agendas for the southern African region.



**Enquiries about Southern African Plant Red Data Lists**

National Botanical Institute  
Private Bag X101  
Pretoria 0001  
South Africa  
E-mail: [reddataalist@sabonet.org](mailto:reddataalist@sabonet.org)  
Tel.: (27) 12 804 3200  
Fax: (27) 12 804 3211  
<http://www.sabonet.org>  
<http://www.nbi.ac.za>

